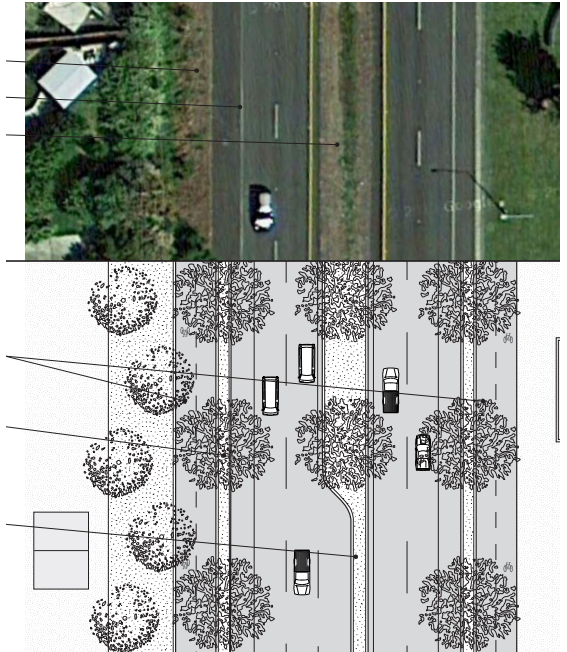
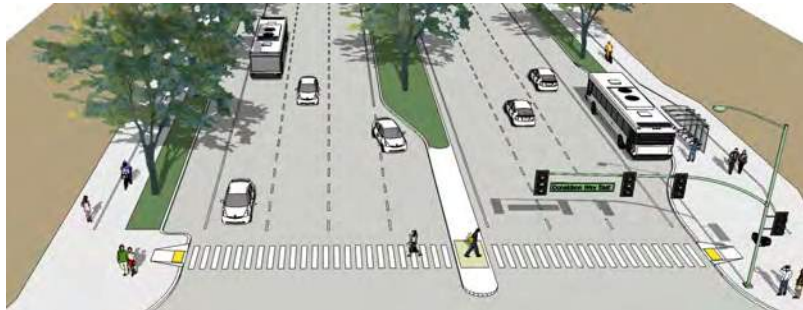
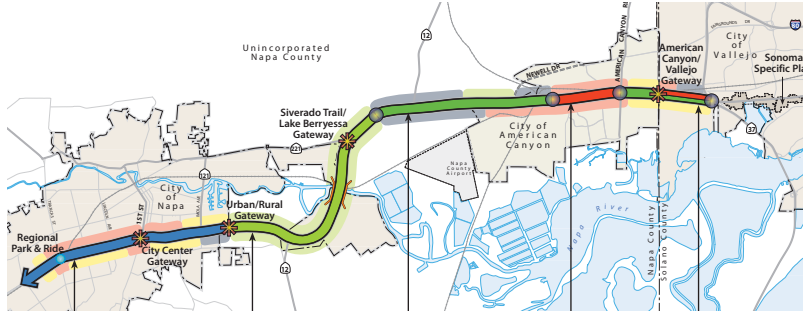


Napa County Transportation and Planning Agency



State Route 29 Gateway Corridor Improvement Plan OCTOBER 2014

Prepared by:

DYETT & BHATIA
Urban and Regional Planners

In association with:

Fehr & Peers

Bottomley Design & Planning

BKF Engineers

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TABLE OF CONTENTS

1	INTRODUCTION.....	1-1
	Background and Purpose	1-1
	Process	1-2
	Organization of This Plan	1-3
	Next Steps	1-3
2	EXISTING CONDITIONS	2-1
	Land Use and Community Character.....	2-1
	Growth and Regional Plans.....	2-7
	Transportation Conditions.....	2-8
3	VISION	3-1
	Role of the Vision.....	3-1
	Input to the Vision Plan	3-2
	Vision Statement, Guiding Principles, Objectives	3-7
4	PROPOSED PROGRAM	4-1
	Methodology	4-1
	Improvements by Segment and Intersection	4-4
	Active Transportation.....	4-37
	Transit Service.....	4-39
	Community Character Recommendations	4-42
5	IMPLEMENTATION	5-1
	Project Costs and Funding	5-1
	Project Prioritization	5-6
	Governance and Coordination	5-8

FIGURES

FIGURE 2-1	Generalized Land Use Designations	2-2
FIGURE 2-2	Subregional Context.....	2-10
FIGURE 2-3	Existing Roadways and Planned Extensions.....	2-11
FIGURE 2-4	Existing Roadway Volumes: AM Peak.....	2-12
FIGURE 2-5	Existing Roadway Volumes: PM Peak	2-13
FIGURE 2-6	Existing Roadway LOS: PM Peak.....	2-14
FIGURE 2-7	Existing Intersection LOS (AM and PM Peak)	2-15
FIGURE 2-8	Planned Roadway Improvements	2-18
FIGURE 2-9	Existing Transit Service.....	2-20
FIGURE 2-10	Existing and Proposed Bicycle Facilities	2-22
FIGURE 2-11	Existing Policy Matrix	2-25
FIGURE 3-1	Highway Character Diagram.....	3-5
FIGURE 4-1	Key Map	4-2
FIGURE 4-2	Summary of Proposed Improvements	4-3
FIGURE 4-3	Existing Conditions - Segment 1.....	4-5
FIGURE 4-4	Existing and Proposed Conditions - Section 2 Parkway Concept.....	4-6
FIGURE 4-5	Proposed Section - Segment 2 Parkway Concept.....	4-7
FIGURE 4-6	Existing and Proposed Conditions - Section 2 Parkway/Boulevard Concept..	4-8
FIGURE 4-7	Proposed Section - Segment 2 Parkway/Boulevard Concept	4-9
FIGURE 4-8	Existing and Proposed Conditions - Section 3 Boulevard Concept	4-12
FIGURE 4-9	Proposed Section - Segment 3 Boulevard Concept	4-13
FIGURE 4-10	Existing and Proposed Conditions - Section 3 Modified Boulevard Concept ..	4-14
FIGURE 4-11	Proposed Section - Segment 3 Modified Boulevard Concept.....	4-15
FIGURE 4-12	Perspective - Segment 3 Modified Boulevard Concept	4-16
FIGURE 4-13	Existing and Proposed Conditions - Segment 4 Parkway Concept.....	4-20
FIGURE 4-14	Proposed Section - Segment 4 Parkway Concept.....	4-21

FIGURE 4-15	Existing and Proposed Conditions - Segment 4 Rural Highway Concept	4-22
FIGURE 4-16	Proposed Segment - Segment 4 Rural Highway Concept	4-23
FIGURE 4-17	Bicycle Connections at South Kelly Road	4-24
FIGURE 4-18	Tight Diamond Interchange Design - Intersection 8	4-26
FIGURE 4-19	Single Point Urban Interchange (SPUI) Design - Intersection 8.....	4-26
FIGURE 4-20	Existing Conditions - Segment 5.....	4-28
FIGURE 4-21	Partial Grade-Separated Interchange Design - Intersection 9	4-31
FIGURE 4-22	Full Grade-Separated Interchange Design - Intersection 9	4-31
FIGURE 4-23	Channelization Design - Intersection 10.....	4-34
FIGURE 4-24	Existing Conditions - Segment 6.....	4-36
FIGURE 5-1	Cost Estimate Summary Table	5-3

TABLES

TABLE 2-1	Projected Growth in Selected Areas.....	2-7
TABLE 2-2	Existing and Cumulative Conditions Intersection LOS	2-9
TABLE 4-1	Intersection 1 Performance (SR 29/SR 37).....	4-10
TABLE 4-2	American Canyon Network Performance	4-17
TABLE 4-3	American Canyon Intersections Performance	4-18
TABLE 4-4	Intersection 7 Performance (SR 29/South Kelly Road).....	4-25
TABLE 4-5	Intersection 8 Future Peak Hour LOS and Delay.....	4-27
TABLE 4-6	Intersection 8 Performance (SR 29/Jameson Canyon Road)	4-29
TABLE 4-7	Intersection 9 Performance (SR 29/SR 221)	4-32
TABLE 4-8	Intersection 10 Performance (SR 29/SR 121/SR 12).....	4-32
TABLE 4-9	Alternative Future Peak Hour LOS and Delay, Carneros Intersection	4-33
TABLE 4-10	General Characteristics of Bus Rapid Transit.....	4-40
TABLE 4-11	Guidelines for BRT Feasibility.....	4-41
TABLE 5-1	Recommended Project Phasing	5-7

APPENDICES

APPENDIX A: COMMUNITY VISIONING WORKSHOPS SUMMARY

APPENDIX B: N-STDN MODEL UPDATE METHODOLOGY

APPENDIX C: INTERSECTION MODELING RESULTS

APPENDIX D: COST ESTIMATION METHODOLOGY AND DETAIL

APPENDIX E: PUBLIC COMMENTS ON DRAFT PLAN

APPENDIX F: MICROSIMULATION MODELING RESULTS

APPENDIX G: SONOMA BOULEVARD CORRIDOR DESIGN PLAN

1 INTRODUCTION

BACKGROUND AND PURPOSE

The “State Route 29 Gateway Corridor Improvement Plan” is a planning project, led by the Napa County Transportation and Planning Agency (NCTPA), to develop a community-driven vision and improvement strategy for the southern portion of California State Route 29 (SR 29). The portion of SR 29 considered constitutes an important “gateway” to the Napa Valley as an experience and also as a corridor through which considerable regional traffic must pass.

The project area extends seventeen miles from the Vallejo ferry terminal at the southern end to Napa’s Trancas Park and Ride lot bus node at the northern end. Jurisdictions through which the corridor passes include: the City of Napa, unincorporated Napa County, the City of American Canyon, and the City of Vallejo. Napa County, Solano County and Caltrans have an interest in the project as an important part of county- and region-wide transportation networks. Caltrans owns and controls the SR 29 right of way and has made this project possible with a \$300,000 grant to implement its community-based planning program.

The project brings together diverse interests and addresses the needs and desires of residents, commuters, business owners, visitors and stakeholders, to improve mobility, safety, and community character along the Corridor. The project also considers the role played by all transportation modes including auto, truck, bus, rail, bicycle and pedestrian.

Objectives

Specific objectives were developed as part of the project, which were used to identify appropriate improvement strategies and implementation measures. These objectives included:

Transportation Performance. The Improvement Plan will help minimize traffic congestion through the corridor, while enhancing pedestrian, bicycle and transit routes. Through traffic and local access needs will be addressed.

Advanced Technologies and Programs. Project goals will be advanced by the best available technologies and by “transportation demand management” (TDM) and other programs that can affect corridor use in beneficial ways.

Physical and Design Improvements. The Improvement Plan will include recommendations for physical modifications to enhance transportation improvements, but also to enhance the character of each community and support desirable adjacent development patterns.

Implementation Tools. The Plan will include strategies for implementing programs and improvements, such as financing tools and timing improvements to correspond with the timing of adjacent development.

Alignment with each community’s aspirations. NCTPA recognizes that the “right” design improvements or transportation programs mean different things to different communities, and may vary depending on whether the highway is passing through urban commercial areas, industrial areas, or rural farmland. Stakeholders and interest groups from all of these communities should have the opportunity to share their vision for how the corridor should be improved, which helps to ensure that the ultimate improvements that the Plan identifies will be effective and context-sensitive.

PROCESS

Project Phases

The project included two major phases: Vision and Implementation.

Phase I: Vision. The Vision for the corridor describes a long-term vision for each unique segment of the highway based on community preferences and regional transportation needs. In written and graphic form, the Vision is comprised of general goals and strategic objectives. The Vision addresses transportation performance and describes the community character aspired to in specific locations.

Phase II: Implementation. The Implementation Program recommends specific physical modifications and transportation programs for the corridor. Physical improvements include different ways of configuring through traffic, local traffic, transit, bicycle paths, and pedestrian environments. Transportation programs include new technologies, transportation demand management programs, or other policy-related actions to be undertaken by NCTPA and/or participating jurisdictions. Improvements have the potential to stimulate desirable forms of development and redevelopment on adjacent parcels. Place-based design guidelines are described, and strategies for prioritizing and financing improvements are addressed.

The results of both phases are combined here into the final Gateway Corridor Improvement

Plan. Technical analysis of existing conditions and modeling of future scenarios help inform development of both the Vision and the recommended improvements.

Community Input

The SR 29 corridor community played a critical role in formulating the initial goals and objectives, ideas, vision, and ultimate recommendations for the corridor. Community members, elected officials, staff, Caltrans representatives, and other stakeholders participated throughout the process in a series of committee meetings and general public events. The formal committees that helped directly steer the process are described below.

Committees

The “Citizens Advisory Committee” (CAC) was formed to be a working group to review ideas, materials and recommendations, and to provide guidance for revisions and further development. The purpose of the CAC was to help ensure that all stakeholder perspectives would be considered, and to identify and address potential disagreements early on.

A “Staff Working Group” (SWG) also reviewed ideas, materials and recommendations in a process that roughly paralleled review by the CAC. The SWG was comprised of staff representatives from each of the participating jurisdictions, and reviewed draft recommendations critically to ensure consistency with policies, standards, and local community direction.

Input from the CAC and SWG was incorporated into recommendations that then went before to the “Corridor Steering Committee” (CSC) for formal action. The CSC consisted of mayors and other top-level decision-makers from jurisdictions with an interest in the project. CSC members are expected to work with their respective City Councils and Boards to adopt policies and programs to implement this project’s recommendations upon Plan adoption.

Stakeholder Interviews

Supporting the recommendations of the committees and the input gained from the workshops, the planning team conducted a series of interviews with additional stakeholders along the corridor. These focused on commuters using some or all of the corridor on a frequent or daily basis. Forty interviews were conducted by phone during the visioning stage of the process. Interviewees were selected to represent key community sectors including business developers, non-profit organizations, law enforcement, environmental advocates and concerned citizens.

Community Workshops

Two community “visioning workshops” were held in November 2012 to solicit input on the SR 29 Gateway Corridor Improvement Plan. The workshops were designed to engage a diverse set of community members representing a range of interests. The workshops provided opportunities for discussion and direct input relating to the development of a “Vision Plan” for the corridor. More detail on the input gained at this series of workshops is found in Chapter 3: Vision.

A second round of community workshops was held in February 2014 to review and comment on the Public Review Draft Implementation Plan. These workshops were conducted in an “open house” format and allowed community members the opportunity to learn about recommendations for various segments of the corridor, review proposed modifications, ask questions, and provide their feedback.

ORGANIZATION OF THIS PLAN

The SR 29 Gateway Corridor Improvement Plan is organized into five chapters. Following this introduction, these are:

Existing Conditions, summarizing current physical conditions along the study corridor, as well as applicable local plans and policies that affect the roadway and adjacent development. Existing transportation conditions are also described, including roadway and intersection level of service, bicycle and pedestrian conditions, transit service, and current proposed projects.

Vision, describing the Vision Statement and Guiding Principles for corridor programs and improvements. The Vision chapter describes the results of the community workshops that helped create the vision, as well as specific preliminary recommendations for each segment of the corridor, upon which the proposals were based.

Proposed Program, describing the specific physical improvements recommended for each major segment and intersection of the study corridor.

Each section includes a narrative and graphics that describe existing and proposed conditions, alternatives considered, projected performance at buildout, and any constraints on implementation. Corridor-wide urban design guidelines and other community character-related recommendations are also included, as well as proposed improvements for active transportation (bicycles and pedestrians) and public transit service.

Implementation, including preliminary cost estimation of the various proposed improvements, potential funding sources, recommended phasing of the various improvements, and governance recommendations for implementing the plan across multiple jurisdictions.

NEXT STEPS

Recommendations of this plan and the subsequent study will be used to inform other relevant planning documents and implementation programs, such as the Countywide Transportation Plan for Napa County, which will prioritize and direct funding for specific improvement projects. The plan will also guide the preparation of more detailed designs for roadway and intersection modifications by Caltrans and the other jurisdictions—the next steps necessary to program, fund, and initiate construction of a range of improvements that will result in a more balanced, comprehensive, multimodal transportation system for the corridor.

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2

EXISTING CONDITIONS

A clear understanding of existing land use and transportation conditions and the adopted plans that provide policy direction to the corridor is critical to the planning process for the SR 29 corridor. This chapter provides a summary of existing conditions along the study corridor. Land use and community character are described, as well as transportation performance of all modes. Jurisdictions along the project's 13-mile length are considered, including: the cities of American Canyon, Napa, and Vallejo, and unincorporated Napa County. Relevant policies and growth projections from the Bay Area's regional agencies are also included.

LAND USE AND COMMUNITY CHARACTER

The character of the SR 29 corridor varies. The highway's design accounts for some of this variation, but most character-defining features are associated with the built environment that surrounds the highway. Figure 2-1 shows generalized land use designations along the corridor, based on the general plans of the various jurisdictions. Actual existing land use may dif-

fer from how the parcels are designated, but the overall pattern is similar. Different segments are characterized below, and relevant policies are also noted.

Vallejo

Existing Uses and Character

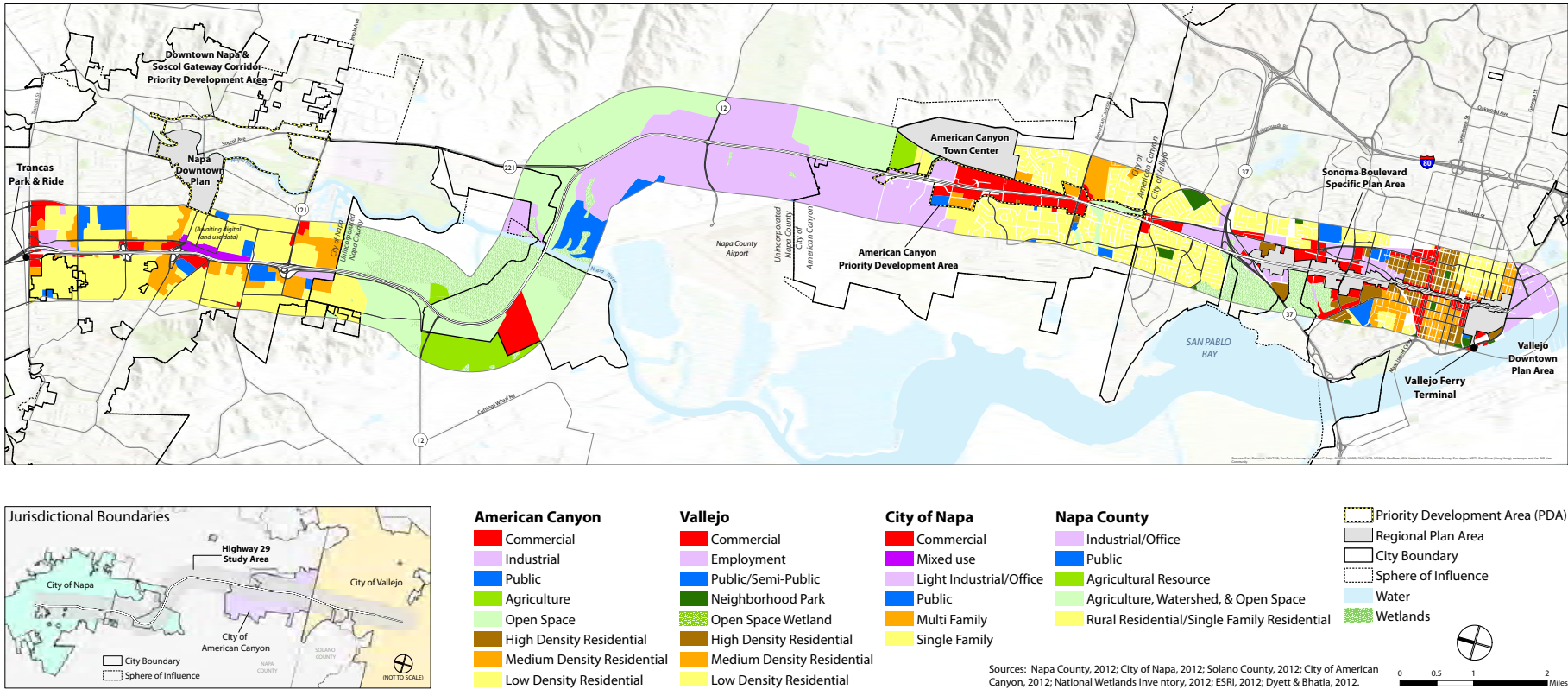
The study area begins in the south in the City of Vallejo. The Vallejo Ferry Terminal, while not located directly on SR 29, represents the southern terminus of the corridor. In Vallejo, the highway is known as Sonoma Boulevard and is the city's primary north-south thoroughfare.

Sonoma Boulevard is a mixed-use corridor, transitioning from urban to more suburban in character as it travels north. Development at the southern end is typically on small parcels and consists of a wide variety of uses, including residential, retail, office, and institutions. While proximate to downtown Vallejo in stretches, the uses along corridor are more automobile oriented, than in the heart of downtown.



South of SR 37 in Vallejo, SR 29 (also known as Sonoma Boulevard) is an urban thoroughfare with a mix of adjacent land uses, building heights, and architectural styles.

Figure 2-1: Generalized Land Use Designations



North of SR 37, the corridor transitions to lower intensity uses, characterized by small markets and liquor stores, fast food restaurants, more auto-oriented services, and some residential development. Buildings are predominantly one story. In the north, development occupies larger footprints and consists of predominantly auto-oriented service commercial uses.

Constraints to development along the corridor in Vallejo include an at-grade railroad crossing at Missouri Street and adjacent wetlands on the west side of the highway between Sereno Drive and Yolano Drive, just south of SR 37.

Planning and Policy Context

The City of Vallejo is preparing a Specific Plan for the Sonoma Boulevard Corridor, which is the same as the SR 29 corridor from downtown Vallejo to the SR 29/37 interchange. The Specific Plan will be developed at the same time and with the same consultant that will update Vallejo's General Plan.

A conceptual Design Plan for the corridor has been completed, and the City retained a consultant to complete the Specific Plan. The Design Plan was released in September 2012, and contains this vision statement for the corridor:

"As the 'spine' of the City of Vallejo, Sonoma Boulevard is an attractive, functional street that is human-scaled and consistently well-connected to encourage all modes of transportation between many distinct districts and destinations. Designed to celebrate Vallejo's

unique, historic, and cultural character, Sonoma Boulevard promotes economic vitality, pedestrian safety, and social and environmental health for the Corridor and the entire City."

The Sonoma Boulevard Corridor Design Plan also sets forth the following broad objectives or "transformative strategies:"

- Encourage job opportunities, thriving businesses, and a range of land uses;
- Develop destination nodes and distinct districts;
- Maintain functional, attractive, and well maintained streetscapes;
- Support a range of transportation modes;
- Prioritize accessible, walkable, bikeable, safe and connected streetscapes;
- Recognize the corridor as an adaptable and vibrant open space network; and
- Require sustainable and environmentally-friendly design.

Land use objectives set forth by the Sonoma Boulevard Design Plan call for: Regional/Destination Commercial uses immediately south of SR 37 (for large footprint commercial uses); Wetlands/Recreation where the Boulevard nears White Slough; and south of White Slough, a variety of mixed-use designations encourage new housing, small scale employment, and local commercial destinations.

The southernmost segment of the corridor falls within Vallejo's Downtown Specific Plan area. The Sonoma Boulevard Overlay land use policies encourage mixed-use buildings, prohibit residential uses on the ground floor, require buildings to define a street wall and face the street. Between Sonoma Boulevard and the Vallejo Ferry Terminal, Southwest Downtown land use policies call for residential uses at higher densities.

City of American Canyon

Existing Uses and Character

The character of SR 29 shifts as it enters American Canyon, which is also the boundary of Napa County. The highway is the only continuous north-south roadway through the city, both providing access to homes and local businesses but also acting as a substantial barrier to east-west local travel through the city. Residential development abuts the roadway on both sides at the southern end of the city, though it is buffered by landscaping. On the east side, the railroad also separates adjacent development from the highway.

Local- and community-serving commercial uses start just south of the intersection of SR 29 and American Canyon Road, and are the predominant land use between there and Napa Junction Road. Uses are auto-oriented, typically single story, and set back from the highway with surface parking and some landscaping. North of Napa Junction Road, land uses transition to light industrial on larger parcels, interspersed with vacant and agricultural land.



Adjacent commercial land uses in American Canyon include community-serving retail and hotels. Uses are auto-oriented, set back from the highway with landscaping and surface parking lots.

Constraints to development in American Canyon along the corridor include the PG&E substation at the northwest corner of SR 29 and American Canyon Road and the railroad right of way to the east of the highway.

Planning and Policy Context

The vision statement in American Canyon's 1994 General Plan calls for "[t]he evolution of American Canyon as a special and distinct community in southern Napa County and the northeast San Francisco Bay Area." General Plan objectives include:

- Be home to a residential population, with a mix of uses to serve local residents;
- Serve as a center of employment and commerce for the region, as well as for locals; and
- Capture visitors to the Napa Valley by providing uses that capitalize on its unique environmental setting.

The City adopted an update to its General Plan Circulation Element in March 2013. A principal focus of the update was compliance with Complete Streets legislation. The Element also seeks to improve access along and across SR 29 for local residents, better accommodate through traffic, enhance SR 29 to serve as a visually attractive gateway, and facilitate creation of a Town Center for the city.

Nearly the entire SR 29 corridor that runs through American Canyon has been designated

as a Priority Development Area (PDA) by the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC). ABAG/MTC give priority to PDAs when issuing technical assistance and capital grants, in exchange for a community's commitment to compact growth and alternative modes within PDAs. The City intends to complete a Specific Plan for the PDA within the next several years.

Most of the PDA has a Community Commercial and Commercial Neighborhood designation under American Canyon's General Plan (see Figure 2-1: Land Use Designations). These designations allow for a range of retail, office, personal services, and other commercial uses; these designations also allow 50 percent of a site to be used for multi-family residential development.

A large part of American Canyon's future growth is anticipated along the corridor and in the Town Center subarea that lies about a quarter mile east of SR 29 between Paoli Loop and Pico Way. The Town Center is conceived as a "downtown" for American Canyon. While most specifics for the Town Center have yet to be adopted, a 2010 Preannexation Agreement Memorandum of Understanding calls for 1,600 housing units. Under the ABAG/MTC Bay Area Plan, American Canyon's PDA is projected to receive about 1,500 housing units and about 800 new jobs (see Chapter 3: Growth and Regional Plans).

Community Commercial land use designations give way to Industrial designations north of Napa Junction Road. Industrial uses include light manufacturing, business parks, warehouses, and supporting retail and restaurants.

South of American Canyon Road, public open space and single-family residential uses are designated, presently exist, and are likely to remain.

Unincorporated Napa County

Existing Uses and Character

Immediately north of the American Canyon city limits (and within American Canyon just north of Napa Junction Road), land uses adjacent to SR 29 consist primarily of business and light industrial parks. Many are to the west, clustered near the Napa County Airport, and support the wine industry. Most industrial parcels south of South Kelly Road connect directly to the highway, with intermittent access to roads shared among multiple parcels. This is not the case north of South Kelly Road. Business parks along this corridor typically exhibit a high level of design—buildings are separated from the highway with landscaping, and properties within the Business/Industrial Park portion of the Airport Area Specific Plan are subject to design review with regards to site planning, landscaping, signage, off-street parking, noise control, and outdoor storage facilities.

North of the industrial area, land uses adjacent to the highway are almost entirely rural, comprised of open space (wetlands surrounding the Napa River) and agricultural uses.

Planning and Policy Context

Napa County’s 2008 General Plan retains a growth management system per voter-adopted Measure A (approved 1980, readopted by Board in 2004). Major objectives of the General Plan are:

- Retain the county’s agricultural resources and character;
- Moderate and direct growth into existing urbanized areas accordingly; and
- Create a sustainable rural community with an agriculture-based economy, high quality of life, responsible and inclusive government.

Within unincorporated Napa County, parcels abutting SR 29 are generally designated either as Agriculture, Watershed and Open Space or Industrial by the County’s General Plan. Urban uses are not permitted on land designated as Agriculture, Watershed and Open Space; however County Policy AG/LU-40 says that “Hess Vineyard area” (just north of American Canyon and east of SR 29) is to be “considered for redesignation to an Industrial designation if [the] Newell Road [extension] is ever extended north of Green Island Road.” However, this is unlikely to occur, as a 2008 voter initiative by the City of American Canyon rerouted Newell Road to connect to SR 29 at Green Island Road specifically in order to preserve the Hess Vineyard.



There is a significant range of land uses and character in this part of the corridor. Close to the American Canyon and the Napa County Airport, industrial parks front the highway. Further north, the landscape becomes more rural.



SR 29 is designed as a freeway through the City of Napa, with adjacent land uses separated from the road by landscaped buffers and/or sound walls.

While most of the corridor is designed for agricultural or industrial uses, exceptions exist: just north and east of the Napa River crossing where the “Napa Pipe” site is slated to be redesignated for multi-family with some retail/commercial uses, and is likely to be annexed to the City of Napa; and south of SR 29 and just east of the Napa River, where land designated as Public-Institutional includes the Napa County Airport and allows for public and quasi-public uses, but also limited commercial uses.

Another asset of this area is the Grape Crusher statue, located just west of the SR 29/Highway 221 intersection. A tourist attraction and significant landmark, the statue helps to signify entrance to the Napa Valley.

City of Napa

Existing Uses and Character

The northern terminus of the corridor study area is in the City of Napa, approximately at the Trancas Park and Ride lot (a transfer point among multiple buses which, like the Vallejo Ferry Terminal, is not located directly on the highway). While SR 29 is a major route through the city, its design as a grade-separated freeway means that it does not interface directly with adjacent land uses, which are a mix of residential, commercial, office, and institutional developments, and are separated from the highway by landscaping and sound walls. Landscape improvements remain possible, along with gateway identity features at interchanges.

Planning and Policy Context

The City of Napa’s General Plan (adopted 1998 with partial updates 2009-2011) seeks to:

- Contain growth within a rural-urban limit line;
- Respects the small-town character and form of existing neighborhoods and commercial areas;
- Maintain a balance of housing and jobs;
- Protect the natural environment;
- Promote features that control flooding; and
- Develop a sustainable economy with a healthy downtown.

Land within the City of Napa’s boundaries extends into agricultural areas. Most of these areas are designated as Resource Areas, which allow very low intensity uses in areas that are visually sensitive, have sensitive habitat, or a resource to be conserved—but only if resource protection standards are maintained. One parcel in this area is designated for Tourist Commercial, which allows for hotels, resorts, and other visitor-serving commercial uses.

Where SR 29 passes alongside urban uses in the City of Napa, a freeway configuration limits access and land use designations vary. Parcels with commercial designations tend to surround freeway interchanges, while other frontages along the freeway include parcels with Corporate Park, multi-family residential, single-family residential and other designations.

The plan does not speak directly to the relationship between SR 29 and adjacent uses; rather, policies in the Circulation Element focus on maintaining acceptable levels of service city-wide and increasing access and connectivity for non-automotive modes of transportation.

GROWTH AND REGIONAL PLANS

Planning for SR 29 must occur within the context of growth and development in the North Bay, and with reference to planning efforts involving the Bay Area as a whole. By 2040, the region is projected to have a total of approximately 4.5 million jobs and 3.4 million housing units, or an additional 1.1 million jobs and 660,000 housing units from 2010 levels. The region's population is expected to grow from 7.15 million people in 2010 to 9.3 million in 2040, as indicated by economic and demographic trends, housing production, and the Bay Area's unique role in the national and state economies.

Regional centers (San Francisco, Oakland, and San Jose) and medium-sized cities account for the majority of the projected growth. Conversely, Napa and Solano counties account for just 1 percent and 3 percent, respectively, of the projected growth. Growth in the North Bay counties is certain to impact conditions on SR 29 and the surrounding roadways. Napa County is by far the smallest County in the region, accounting for under 2 percent of regional population, and is dwarfed by neighboring Sonoma (6.5 percent) and Solano (5.1 percent). However, as job growth in the Bay Area is regional

in nature, additional impacts to SR 29 will be caused by regional commuting patterns from beyond Napa and Solano counties as well.

ABAG and MTC—the regional planning agencies—recently prepared Plan Bay Area, informed by the Sustainable Communities Strategy required to implement SB 375. The plan projects growth in households and jobs through 2040, and identifies strategies for reducing greenhouse gas emissions from cars and light trucks through land use and transportation planning efforts. These strategies plan for future growth in a way that encourages compact development with a broad array of housing types and transportation choices. To accommodate the Bay Area's projected growth while meeting environmental sustainability goals, Plan Bay Area focuses on directing development into PDAs. PDAs are locally identified nodes of develop-

ment (such as a corridor, a downtown, or an area around a transit station) that have substantial opportunity for infill housing that supports increased walkability and transit usage.

Region-wide, PDAs are proposed to absorb about 80 percent of new housing and 66 percent of new jobs on about five percent of the total regional land area. This pattern holds true for the one PDA identified in the SR 29 Corridor Planning Area, in American Canyon (see Figure 2-1: Generalized Land Use Designations). In this city, approximately 81 percent of new housing and 67 percent of new jobs are projected to be located in the PDA. One other PDA has been identified in Napa County: Downtown Napa/Soscol Corridor, north and east of the SR 29 Corridor Planning Area. In Vallejo, the Waterfront and Downtown PDA is located southwest of the Planning Area.

TABLE 2-1: PROJECTED GROWTH IN SELECTED AREAS

Jurisdiction or Area	2010	2040	Growth by 2040	
	<i>Existing Housing</i>	<i>Existing Jobs</i>	<i>New Housing</i>	<i>New Jobs</i>
City of American Canyon	5,980	2,920	1,910 New (+32%)	1,240 New (+42%)
SR 29 Corridor (American Canyon-PDA)	440	1,280	1,540 New (+350%)	820 New (+64%)
City of Napa	30,150	33,950	3,260 New (+11%)	10,570 New (+31%)
Unincorporated Napa County	12,281	24,630	740 New (+6%)	5,380 New (+22%)
City of Vallejo	44,430	31,660	2,530 New (+6%)	11,400 New (+36%)

Source: ABAG and MTC Plan Bay Area Jobs-Housing Connection Strategy, May 2012

Table 2-1: Projected Growth in Selected Areas shows the projected increase in households and jobs in each of the jurisdictions through which the study corridor travels. The greatest percentage increase in both housing and job growth is seen in the American Canyon SR 29 PDA (see Figure 2-1: Generalized Land Use Designations). The City of American Canyon overall is projected to see the greatest percentage increase in housing and job growth than other relevant jurisdictions. The cities of Napa and Vallejo are projected to add a similar number of housing units and new jobs.

Context-sensitive roadway improvements can help accommodate growth while simultaneously enhancing community character and livability. For example, on the Peninsula south of San Francisco, the Grand Boulevard Initiative (GBI) is pursuing a Complete Streets program to reconfigure the El Camino Real as an attractive multimodal roadway, with a balanced approach for accommodating cars, transit, walking and biking, and is using these improvements to encourage street-facing pedestrian-friendly new development. The roadway's local access lanes and amenities have begun to attract development that will accommodate future growth.

TRANSPORTATION CONDITIONS

Motorized Travel

Existing Character

SR 29 serves as an essential north-south connection within the North Bay's transportation network, as well as providing connection to significant east-west access routes such as along Highway 12 (see Figure 2-2: Subregional Context). Notably, SR 29 is a critical commute corridor between Solano and Napa counties. From south to north, SR 29 starts in Vallejo, travels through American Canyon and Napa, and continues into Lake County to the north. In the project study area, SR 29 is a four-lane conventional highway in Vallejo, a four-lane highway/expressway in American Canyon to Highway 121, and a four-lane freeway through the City of Napa.

Many workers commute along the corridor to travel from affordable housing in Solano County to jobs in Napa or Sonoma counties. Over 90 percent of Solano residents commute to their jobs by car. This commute pattern creates congestion on northbound SR 29 during morning peak periods and on southbound SR 29 during evening peak periods.

In the other direction, pockets of congestion occur as Napa Valley residents commute to jobs in the greater Bay Area. Eighty-eight percent of Napa County residents commute to their jobs by car with a fraction of these motorists transferring to public transit, such as ferry service

from Vallejo Ferry Terminal, BART, and NCTPA's VINE commuter services.

Especially during the weekends and during summer and harvest time months, SR 29 plays a significant role as a principal route for tourists to access the Napa Valley wine region. Napa Valley wineries and associated attractions bring 5 million visitor-days per year to Napa County.

SR 29 also plays an important role in carrying local traffic. In American Canyon and Vallejo, the highway is lined with retail commercial uses and other destinations that serve residents and visitors. Local connections to gain access to these commercial uses are often limited solely to the highway itself. In addition, abutting urban areas have a limited number of north-south routes, and SR 29 is used for many local trips (see Figure 2-3: Existing Roadway and Planned Extensions). Planned extensions of Newell Drive, Devlin Road, South Napa Junction Road, and Commerce Boulevard will offer local travelers more north-south options when completed. Figures 2-4 and 2-5 display existing roadway volumes during the AM peak hour and PM peak hour, respectively.

It should be noted that travel demand models are calibrated and validated to mirror existing conditions on a regional scale, for a wide range of facility types and locations. As such, model estimates for specific locations may not exactly replicate existing conditions. Locally collected data such as vehicle traffic counts should always

supersede existing model estimates for planning purposes.

Because of this inherent error in the model (between the existing model estimate and locally collected data), future model estimates should also be used with caution for planning purposes. Future model estimates are used in conjunction with locally collected data to generate forecasted volumes that account for the errors from existing conditions. Forecasted volumes should always supersede future model estimates for planning purposes.

Existing Performance

For the most congested peak period, existing levels of service (LOS) along the roadway and intersecting roads have been evaluated and described diagrammatically (see Figure 2-6: Existing Roadway Level of Service – PM Peak). As defined by the Highway Capacity Manual, LOS is divided into six categories, ranging from LOS A to LOS F. LOS A represents free-flow travel, LOS B through D represent increasing vehicle density but primarily stable conditions, LOS E represents conditions at or near the capacity of the facility in question, and LOS F represents over-capacity, forced flow conditions.

From the SR 29/221 interchange through American Canyon and into Vallejo, SR 29 operates at LOS E or F during the PM peak hour, meaning that the roadway is operating near, at, or above capacity. Essentially, the roadway is trying to accommodate freeway-level demand along a corridor with many intersecting roadways that

Intersection #	Study Intersection	Traffic Control	Peak Hour	Existing Conditions ¹		Cumulative No Project Conditions (2035)	
				Delay (sec)	LOS	Delay (sec)	LOS
1	SR 37 WB Off/On-Ramp/SR 29	Signal	AM	8.6	A	10.2	B
			PM	16.6	B	18.1	B
2	American Canyon Rd/Newell Drive	Signal	AM	32.2	C	66.7	E
			PM	25.1	C	>80	F
3	American Canyon Rd/SR 29	Signal	AM	60.9	E	67.0	E
			PM	45.0	D	72.9	E
4	Donaldson Way/SR 29	Signal	AM	28.9	C	40.7	D
			PM	23.7	C	33.5	C
5	Napa Junction Road/SR 29	Signal	AM	49.9	D	>80	F
			PM	19.2	B	>80	F
6	Green Island Road/SR 29	Not Analyzed ²					
7	South Kelly Road/SR 29	Signal	AM	26.8	C	>80	F
			PM	16.2	B	>80	F
8	Jameson Canyon Road/SR 29	Signal/Interchange ³	AM	46.1	D	24.5 ⁴	C
			PM	44.3	D	61.7 ⁴	E
9	SR 29/SR 221 (Soscol)	Signal	AM	>80	F	>80	F
			PM	>80	F	>80	F
10	SR 12/SR 29/SR 121 (Carneros)	Signal	AM	53.9	D	>80	F
			PM	54.3	D	>80	F

1. The delays shown at Napa Junction Road and American Canyon Road do not include the preceding segment delay experienced by motorists approaching the intersections.
2. This intersection is not analyzed because it is not a full intersection. Since SR29 remains divided at this point there is no through E/W traffic and no EB South or SB East turns.
3. Future design for the Jameson Canyon intersection is characterized in Caltrans' current plans as a "tight diamond" interchange.
4. Diamond interchange consists of two intersections. Weighted average delay is reported for both intersections.

Source: Fehr & Peers, 2013.

Figure 2-2: Subregional Context

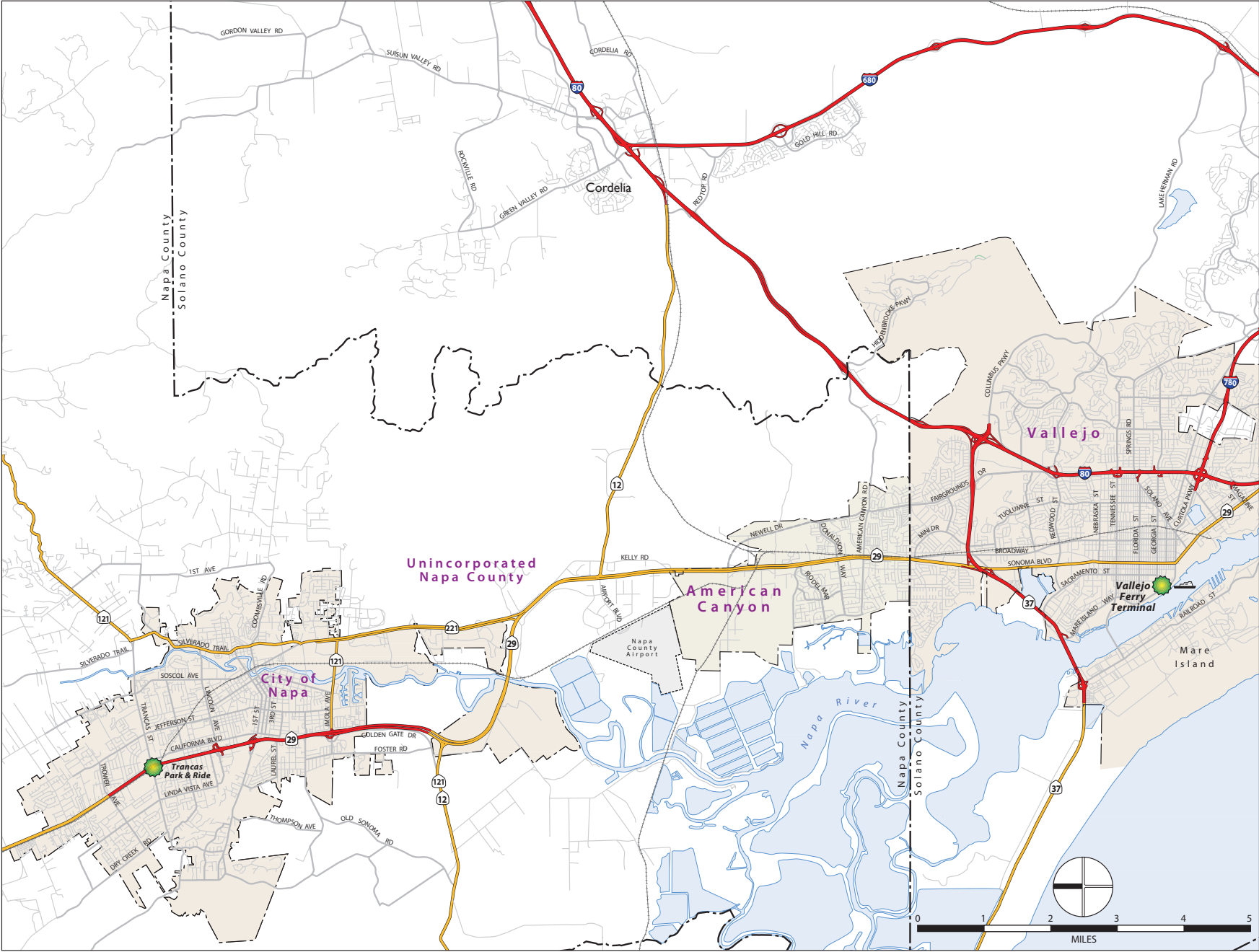
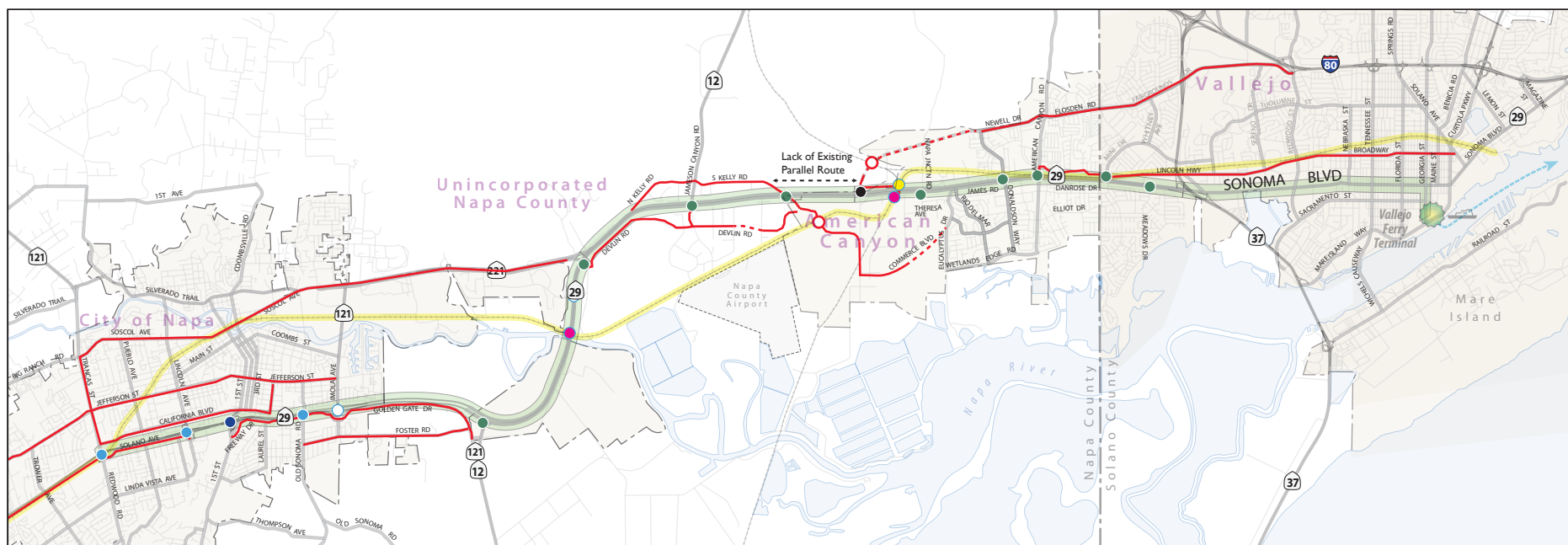
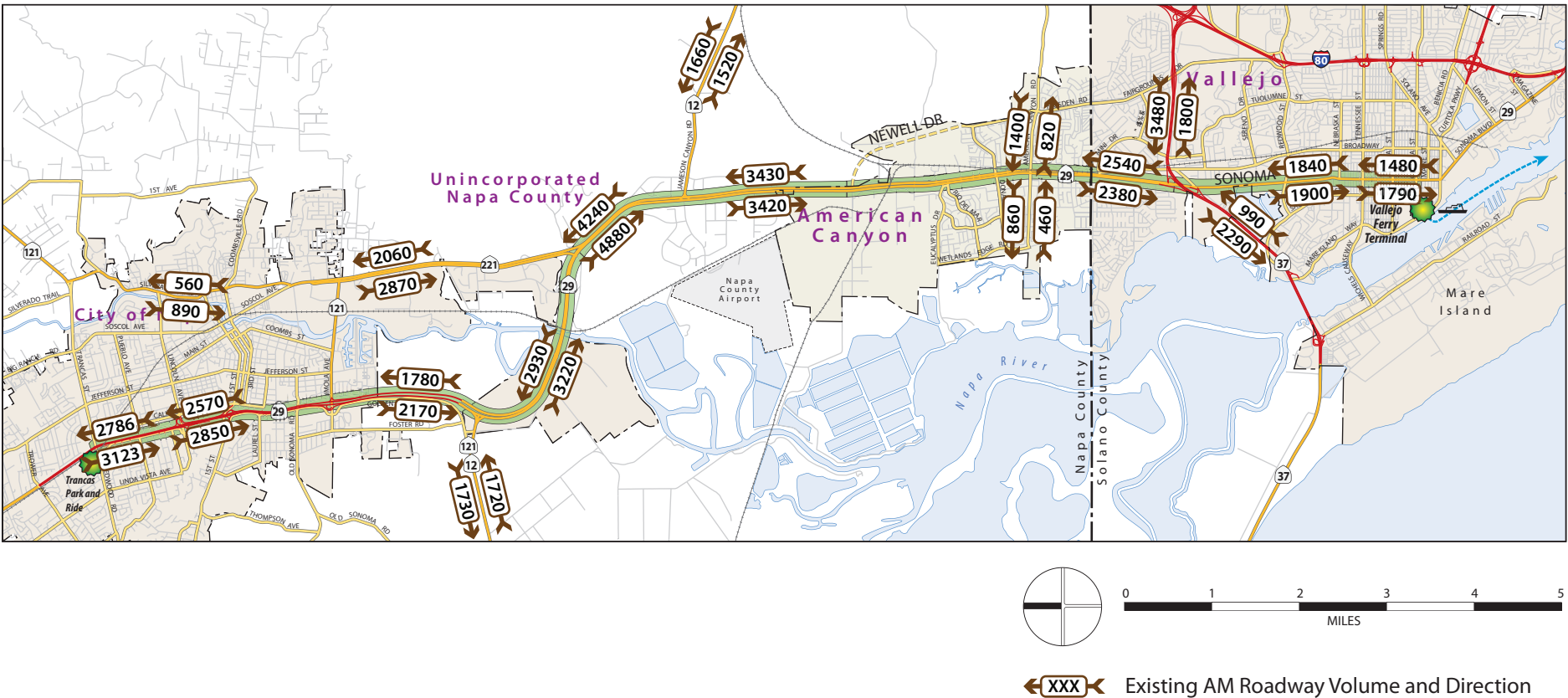


Figure 2-3: Existing Roadways and Planned Extensions



- Overpass Only
- Overpass + On/Off Ramp
- Underpass + On/Off Ramp
- Underpass
- Railroad Underpass
- Grade Separated Railroad Crossing
- At Grade Intersection
- No Crossing - On/Off Ramp Only
- Existing Parallel Routes
- - - Planned Extensions

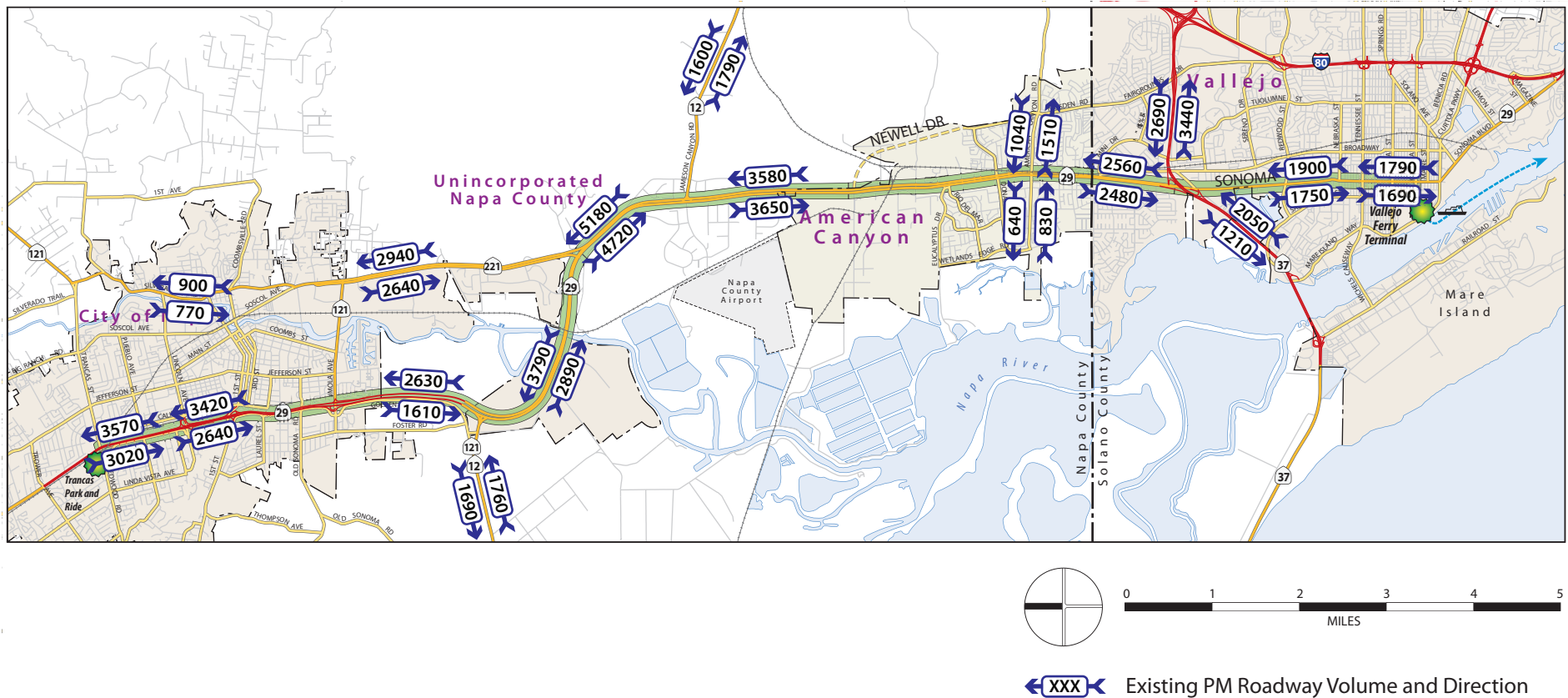
Figure 2-4: Existing Roadway Volumes: AM Peak



Source: Napa-Solano Travel Demand Model, Fehr & Peers 2012

Note: Volumes are estimated. Travel demand models are calibrated and validated to mirror existing conditions on a regional scale, for a wide range of facility types and locations. As such, model estimates for specific locations may not exactly replicate existing conditions. Locally collected data such as vehicle traffic counts should always supersede existing model estimates for planning purposes.

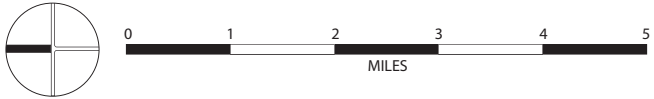
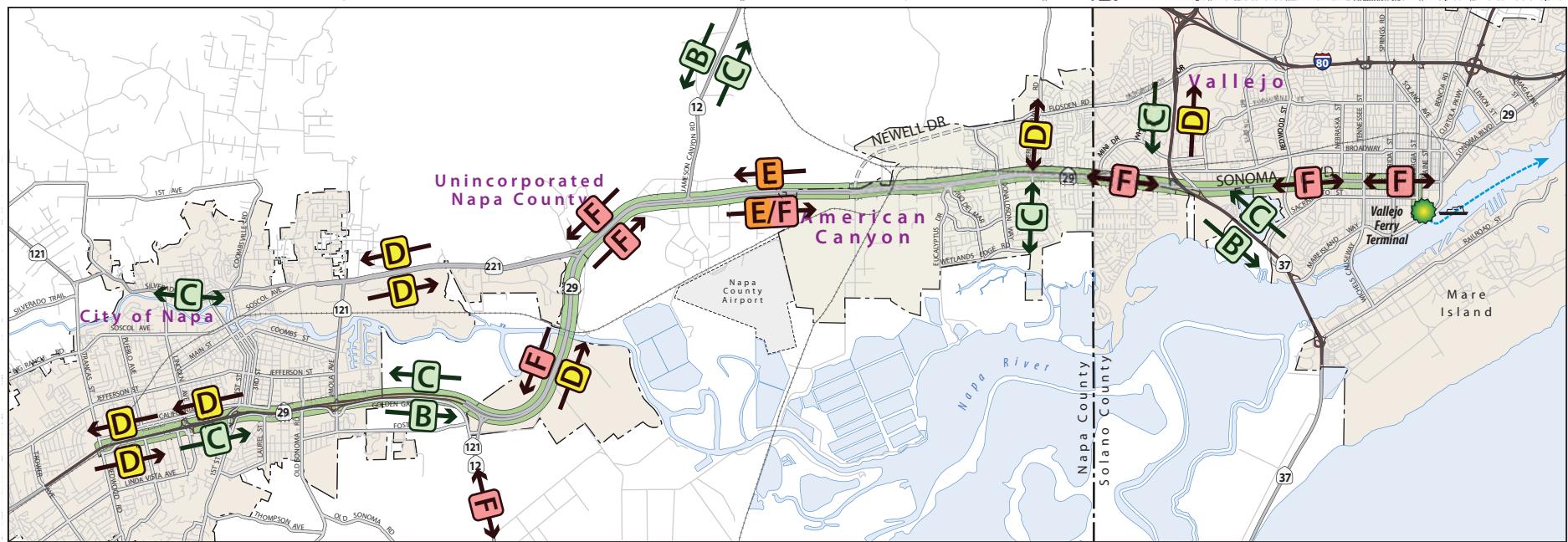
Figure 2-5: Existing Roadway Volumes: PM Peak



Source: Napa-Solano Travel Demand Model, Fehr & Peers 2012

Note: Volumes are estimated. Travel demand models are calibrated and validated to mirror existing conditions on a regional scale, for a wide range of facility types and locations. As such, model estimates for specific locations may not exactly replicate existing conditions. Locally collected data such as vehicle traffic counts should always supersede existing model estimates for planning purposes.

Figure 2-6: Existing Roadway LOS: PM Peak

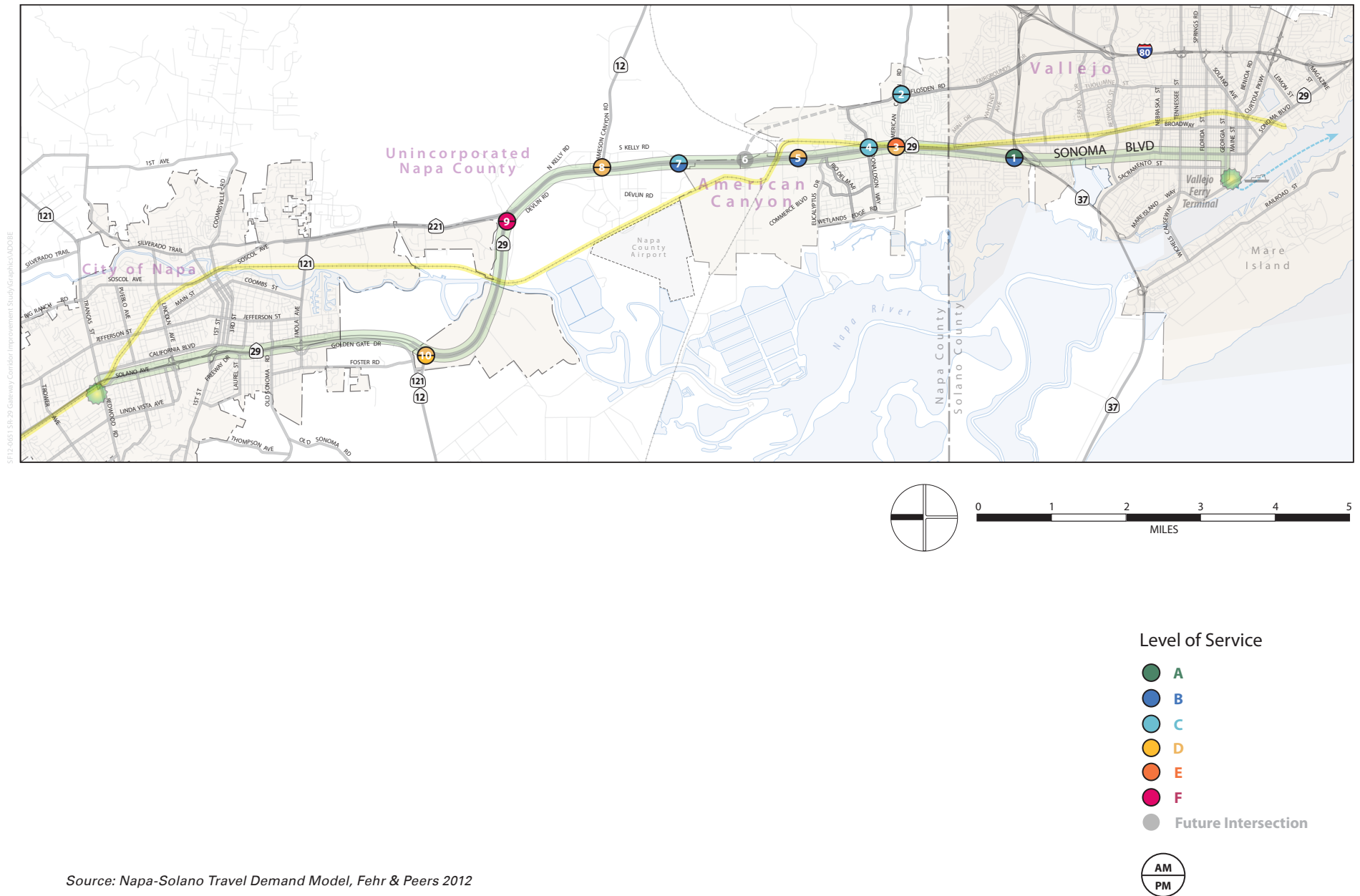


Level of Service

- A LOS A
- B LOS B
- C LOS C
- D LOS D
- E LOS E
- F LOS F

Source: Napa-Solano Travel Demand Model, Fehr & Peers 2012

Figure 2-7: Existing Intersection LOS (AM and PM Peak)



Source: Napa-Solano Travel Demand Model, Fehr & Peers 2012

Note: Reported intersection LOS at Napa Junction Road and American Canyon Road do not account for the preceding roadway segment delay experienced by motorists approaching the intersection.

have the effect of reducing north-south capacity. Significant delays through intersections and slow travel speeds along the corridor attest to these poor operating conditions.

North of the SR 29/221 interchange the roadway operates at or above capacity in the northbound direction to the SR 12/121 turnoff to Sonoma. The freeway segment in the City of Napa operates at an acceptable level of service due to full grade separation.

Table 2-2 summarizes the intersection LOS for the AM and PM peak under current conditions and projects the future (2035) intersection LOS in the “no project” condition (e.g., if modifications were not made).

Figure 2-7, Existing Intersection Level of Service, depicts the current performance of the 10 key intersections along the corridor and in the surrounding area.

The stretch of the corridor connecting Napa to American Canyon has intersections operating at LOS E or F during the PM peak hour. These include SR12/SR29, SR221/SR29, and Airport Blvd/SR29. Intersections through American Canyon are operating acceptably although American Canyon Rd/SR29 is operating at LOS D during the PM peak.

Currently Planned Future Roadway Improvements

The future roadway improvements currently planned for the corridor will alleviate specific bottlenecks at SR 29/SR 221 by constructing a flyover and at SR 29/Airport Boulevard by constructing a grade-separated interchange (see Figure 2-8: Planned Roadway Improvements).

Roadways that can serve as parallel routes to SR 29 are limited (see Figure 2-3: Existing Roadway and Planned Extensions). Parallel routes could help reduce traffic congestion on SR 29 as an alternative for local travel and some through trips. New parallel routes will be provided for local travel with the extensions of Devlin Road, Newell Drive, South Napa Junction Road, and Commerce Boulevard. Jameson Canyon Road (SR 12) also serves as an alternative route, and widening of this roadway to four lanes will be completed in 2014.

These currently planned improvements alone will not supply a comprehensive solution to corridor traffic. Thus, additional roadway modifications as well as ways to shift motorists into other modes and ways to encourage motorists to commute during non-peak hours will be considered as parts of this Plan.

Roadway Policy Context

For each jurisdiction or agency that would be affected by the SR 29 Gateway Corridor Improvement Plan, transportation planning and policy documents were reviewed to determine consistency or variation in visioning of the cor-

ridor. The various plans summarized below show a general consistency with reducing the traffic congestion along the corridor while envisioning a more multi-modal, complete streets network. Some variations include the City of American Canyon’s plan to increase the number of travel lanes on SR 29 to three in each direction within the City boundary, the Sonoma Boulevard Corridor Plan recommendation for lane reductions or road diets in certain segments in Vallejo, and Caltrans recommendation of maintaining SR 29 as a four-lane highway.

CALTRANS

Caltrans developed the Draft Corridor Plan State Route 29 (2010), which provides recommendations for multi-modal operational strategies for this state highway. This document is a preliminary draft. Caltrans has updated its guidance on developing Transportation Concept Reports (TCRs) for State Routes and will be updating the State Route 29 TCR after the Gateway Corridor Improvement Plan is adopted. Caltrans will use this plan to inform the State Route 29 TCR.

Some of the key roadway recommendations in the 2010 Draft Plan include: optimizing signal timing for throughput at a safe speed, increasing multi-modal mode share in the full length of the corridor, study the concept of constructing an HOV lane from City of Napa to the Vallejo Ferry Terminal, and utilizing Intelligent Transportation Systems (ITS) as a key strategy for allowing throughput increases without adding lanes. The plan suggests some ITS strategies,

including: increased driver information systems, advanced traffic signals, roadway and weather monitoring stations, highway advisory radio, closed circuit television cameras, and fiber optic communication. Implementing an HOV lane would require significant study and effort, and the Plan does not provide any additional detail regarding this recommendation.

VALLEJO

The Sonoma Boulevard Corridor Design Plan (2013) Planning Area spans 5.5 miles between Curtola Parkway in the south and State Route 37 in the north. The plan details the general location of land uses, streetscape design concepts, and proposed circulation patterns for all modes of transportation along Sonoma Boulevard. Recommendations range along the corridor and include installation of bicycle lanes, reduction in automobile travel lanes or travel lane widths, street reconfigurations, and various land use development focuses. The Plan does not focus on vehicle operations or capacity increases. The SR 29 Corridor Plan will not focus on the Vallejo area due to the recent detailed analysis completed for the Sonoma Boulevard Plan and the forthcoming Specific Plan for this area.

CITY OF AMERICAN CANYON

The American Canyon Circulation Element (2013 update) provides some specific policy guidance for SR 29. The City plans to design the system to discourage regional traffic from bypassing SR 29 and impacting local streets, while at the same time exploring a complete streets

approach that will expand the travel capacity of the roadway. The major SR 29 modification is to widen the four-lane arterial to a six-lane arterial (from the southern to northern limits of the city). Other improvements include completion of parallel routes for local travel, including Devlin Road, Newell Drive, South Napa Junction Road, and Commerce Boulevard. The signal at Rio Del Mar will be eliminated, and Eucalyptus Drive will be extended to SR 29.

CITY OF NAPA

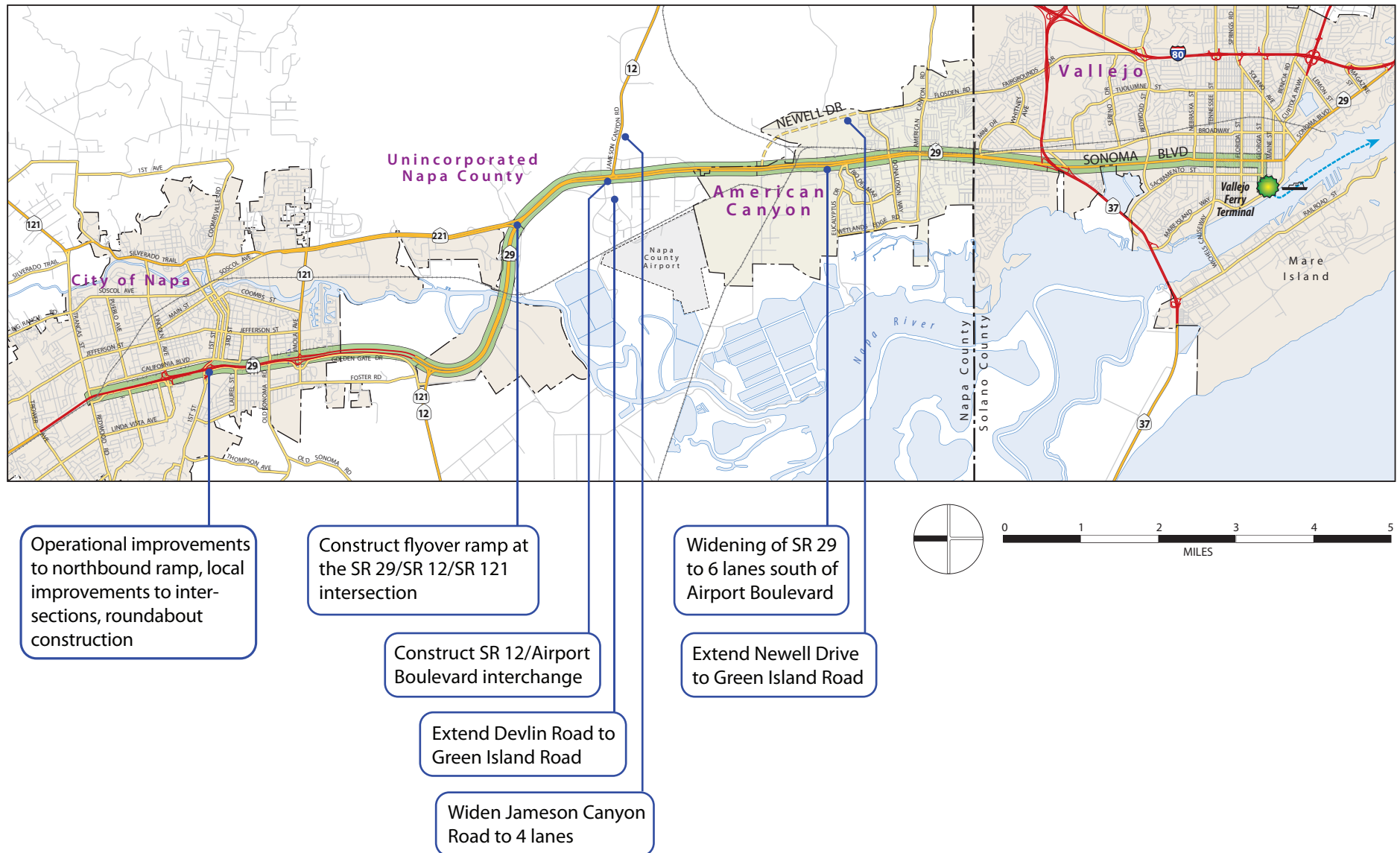
The City of Napa General Plan (2011 update) has several major transportation objectives: develop a transportation infrastructure that provides for an acceptable traffic flow and provides access to all destinations, create a multi-modal citywide transportation system, and minimize the negative effects of additional automobile traffic and other transportation. The Plan has no specific emphasis on SR 29, which functions as a free-way within the City.

NAPA COUNTY

In the Napa County General Plan Circulation Element (2008), the County seeks to provide a roadway system that maintains current roadway capacities in most locations and is both safe and efficient in terms of providing local access. The County also seeks to discourage increases in commuter traffic passing through the County on all roadways except I-80 by designing County roadways to meet local rather than regional needs and by supporting improvements to alternative facilities outside Napa County (e.g., State Route 37). The General Plan circu-

lation map shows a six-lane “Rural Throughway” for the entire length of the unincorporated area included in this study. The General Plan includes the following roadway modifications relevant to this study, including: widening of Jameson Canyon Road (SR12), interchange at the intersection of SR12, Airport Boulevard, and SR 29, extension of Newell Road to Green Island Road, extension of Devlin Road between Soscol Ferry Road and Green Island Road, widen SR 29 in American Canyon, and synchronize traffic signals along SR 29 in American Canyon.

Figure 2-8: Currently Planned Roadway Improvements



Public Transit

Existing Character

Based upon analysis presented in the 2008 VINE Short Range Transit Plan and 2011 Market Segmentation Study, in recent years significant investments were made in public transit in the Napa Valley impacting the study corridor. These include new local and regional bus routes with increased service frequencies and reduced travel times, the introduction of inter-county express bus service, the addition of park-and-ride lots, new buses, new technology and a new multi-modal transit center and rapid transit corridor within the City of Napa. In 2010, American Canyon Transit local bus service was also redesigned. The result has been a significant growth in commuter use of public transit and improved system on-time performance.

Existing Performance

Transit access along the SR 29 corridor between Napa, American Canyon, and Vallejo has been significantly enhanced in recent years. The study area is served by VINE Transit, American Canyon Transit, SolTrans and Amtrak bus lines (see Figure 2-9: Existing Transit Service). Five regional routes (discussed below) provide mobility to transit customers in the study area, with three operating on weekends.

VINE Route 11 provides service between Napa and Vallejo Ferry Terminal via American Canyon and unincorporated Napa County. The route operates every 45 to 60 minutes, all day, seven days a week. Because of its frequent stops,

the one-way travel time of one hour between downtown Napa and downtown Vallejo make it difficult for bus service to compete with the automobile and even more so with potential customers with origins or destinations more than a ¼ mile walk from a bus stop. In spite of this, the route's primary riders are commuters with buses operating at standing room only capacity, and turning away passengers at stops, during peak AM and PM commute hours.

VINE Route 29 is an express route that offers service between Calistoga, the Vallejo Ferry and the El Cerrito Del Norte BART Station via Napa and American Canyon. The route operates with thirteen outbound and eleven inbound trips each weekday to/from BART. This route primarily serves commuters and due to its limited stops and ability to use the carpool lane, travel time approximates that of a single occupancy vehicle. The buses feature wi-fi, reclining seats, and tray tables.

VINE Route 21 is an express bus service between Napa, Fairfield and the Suisun Train Depot. The route travels through Jameson Canyon and makes seven round trips per day on weekdays. Buses feature wi-fi and reclining seats. The service connects to the public transit system in Fairfield as well as the Capital Corridor train service.

All VINE routes are aligned to connect to the City of Napa's recently enhanced bus system and take advantage of the City's new multi-modal transit facility and rapid transit corri-

dor, permitting quick and convenient transfers between local and regional routes.

American Canyon Transit is the local bus service for that community. It operates Weekdays from 6AM to 6:45 PM. Its deviated fixed routes are designed to service commuters by connecting local neighborhoods to the VINE routes 11 and 29 and Soltrans Route 1.

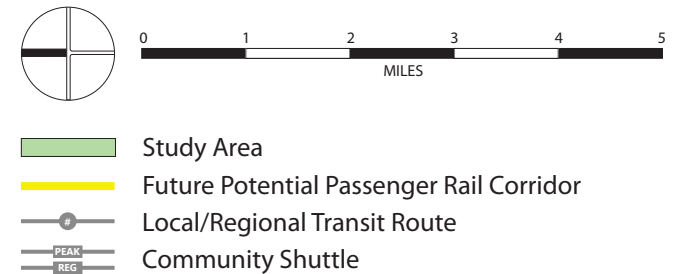
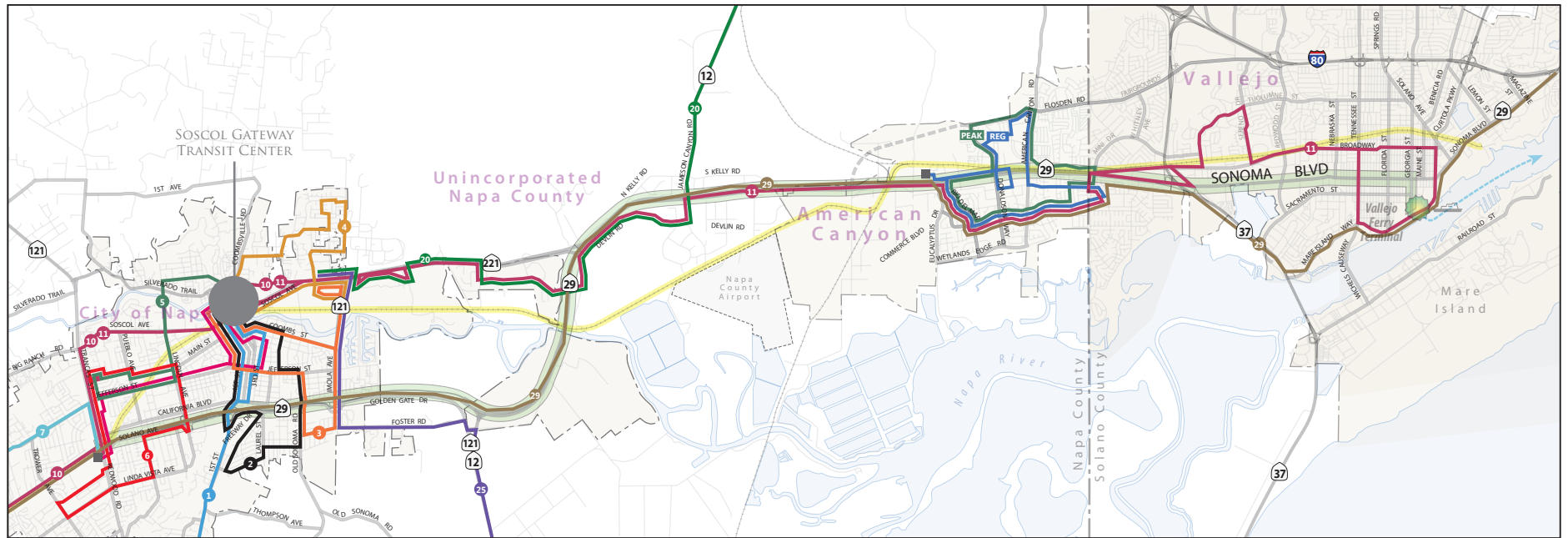
Soltrans Route 1 runs between the Vallejo Transit Center and Mini Drive and operates seven days a week with frequency varying between every 30 to 60 minutes depending on time of day and day of week.

Amtrak provides connector bus service between Napa and the train station in Martinez with two stops in Vallejo. The service operates three Northbound and two Southbound runs, seven days a week.

Future Improvements

In general, future public transit improvements discussed in plan documents are at the policy level rather than identifying specific route additions, changes, or improvements. For the American Canyon Circulation Element Update, the Plan discusses building a multi-modal transit center on SR 29 within the designated Community Center or Town Center. In addition, it recommends providing transit linkages between the Community Center or Town Center and regionally related transit such as BART, commuter railway and the Vallejo ferry. Current VINE routes 11 and 29, as well as American

Figure 2-9: Existing Transit Service



Canyon Transit, would benefit from such a facility.

Public Transit Policy Context

The plans summarized below show a consistent desire to expand and improve public transit, particularly by improving regional connections and emphasizing its use as an alternative to vehicle commute trips. Policies also emphasize the importance of funding improvements, but acknowledge limited funding options and generally avoid making specific recommendations.

CALTRANS

In its Draft Corridor Plan State Route 29 (2010), Caltrans makes transit recommendations that include: encouraging use of excess right-of-way for bus stops and park and ride facilities, increase the reliability and frequencies of existing public transit (particularly VINE route links to the Vallejo Ferry Terminal), upgrading mass transit services (consider lane additions, bus rapid transit, parallel routes in the southern county and Jameson Canyon), and promoting increased housing density and transit-oriented development along the corridor. The recommendation of an HOV lane (previously noted) was envisioned as a transit beneficial strategy.

VALLEJO

As discussed in the Roadway section, the Sonoma Boulevard Corridor Design Plan (Draft 2012) details the general location of land uses, streetscape design concepts, and proposed circulation patterns for all modes of transportation along Sonoma Boulevard.

CITY OF AMERICAN CANYON

The American Canyon Circulation Element (2013 update) provides policies to promote the use of public transportation and emphasizes continued collaboration with other agencies and jurisdictions to promote local and regional public transit. In terms of local transit, American Canyon calls for expanding and improving local transit operations, the City's demand-responsive transit system, and maintaining consistency with the NCTPA Congestion Management Plan.

CITY OF NAPA

The City of Napa General Plan (2011 update) has a public transit goal to develop and maintain an efficient and convenient transit system with connections to Napa County and the region. Some recommended performance targets include increasing transit mode split to five percent by 2020, locating bus routes within one quarter-mile of 85 percent of city residences (90 percent of city activity centers), and operating at half-hour intervals for 60 percent of bus routes. The latter recommendation was met and exceeded with the VINE's system redesign in 2012. While Napa's General Plan recognizes the need to increase transit service to meet these targets, it acknowledges the lack of available public subsidies and conditions some transit policies on the availability of funding.

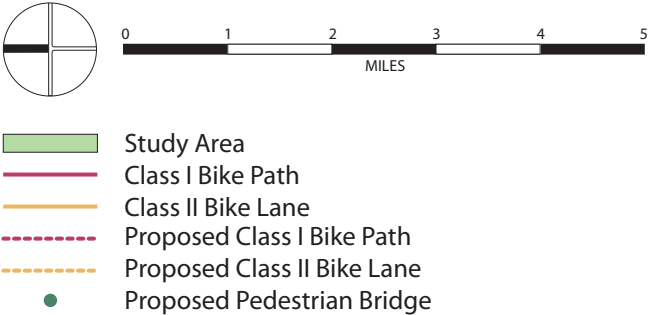
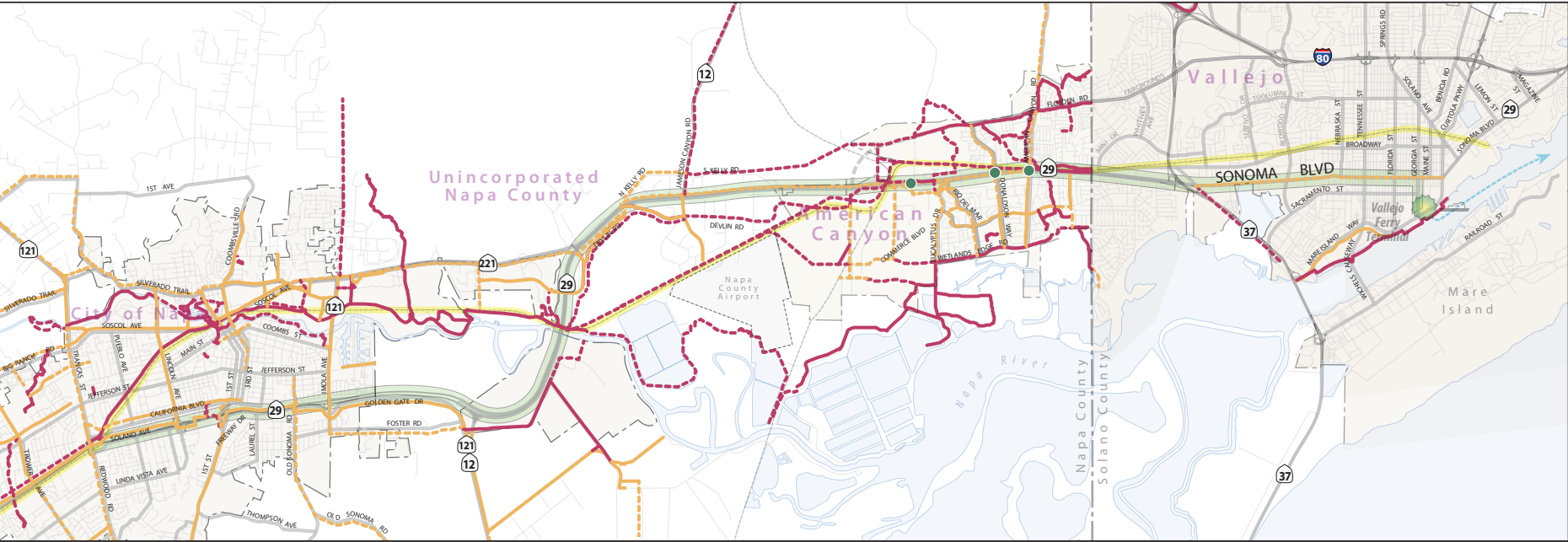
NAPA COUNTY

In the Napa County General Plan Circulation Element (2008), the County is focusing on

increasing the attractiveness and use of energy-efficient forms of transportation such as public transit, walking, and bicycling through a variety of means, including promoting transit-oriented development in existing municipalities and urbanized areas and the use of transit by visitors to Napa County. These general policy goals do not include specific actions. There is also emphasis on reducing the percentage of work trips that are by private, single-occupant vehicles by 2030 such that Napa County's percentage decreases to 50 percent. Some of the policies identified to help meet this goal include: working with NCTPA to conduct regular reviews of public transit use and opportunities for its expansion in Napa County and encouraging implementation of transportation demand management programs with the County of Napa and other major employers.

The NCTPA Short Range Transit Plan (SRTP) (2013) presents service plan concepts but is careful not to label them as recommendations due to financial constraint concerns. Some of the key concepts not already implemented include: expanded weekend and evening service in the City of Napa, increase service hours for American Canyon Transit, and increase marketing efforts.

Figure 2-10: Existing and Proposed Bicycle Facilities



Bicycle Facilities

Existing Character

The county's mountains, valleys, and scenery attract recreational and tourist cyclists who are looking for a physically challenging and beautiful bicycle ride excursion. Along the corridor itself, the terrain is relatively flat and compact, characteristics that are optimal for inter-city commuting and intra-city utilitarian trips. Currently, inter-city travel on the valley floor via bicycle can be challenging because of limited paths, roads with high speed traffic, and geographic barriers including the Napa River.

Existing Performance

There are no existing bicycle facilities that connect the entire length of the SR 29 corridor, and there are few bicycle connections between cities (see Figure 2-10: Existing and Proposed Bicycle Facilities). Planned facilities such as the Vine and Bay Trails will greatly improve mobility for both experienced and casual cyclists.

Some parallel routes are available to bicyclists, however. Currently, more experienced cyclists can travel on bicycle friendly roads that parallel SR 29, such as Devlin Road, Golden Gate Road, and Foster Drive, however SR 29 provides the only continuous connection between American Canyon and Napa and does not include bicycle facilities nor is it a safe or attractive roadway for bicycling due to high traffic volumes and travel speeds.

Future Improvements

The Napa County Bicycle Plan (2012) recommends the following additions or improvements to interregional bicycle facilities in the Plan area:

- The Vine Trail, a continuous Class I multi-use path between the communities of Napa County and the Vallejo Ferry Terminal (running along SR 29 from Calistoga to North Napa, then along the Wine Train corridor across Napa and along the east side of the Napa River south to the Butler Bridge);
- Two parallel Class I multi-use paths parallel to SR 29: the Vine Trail (along Devlin Road and under SR 29 via the Paolo Loop and Watson Line north of American Canyon, then along Newell Road and Broadway through American Canyon) and the Bay Trail (along the east side of the Napa River through American Canyon); and
- Additional Class II and Class III bicycle facilities within the City of Napa and American Canyon that help close route gaps.

In Vallejo, the Sonoma Boulevard Corridor Plan continues the proposed Class II bike lane along SR 29 to connect to the Vallejo Ferry Terminal.

Policy Context

The various plans summarized below express a similar desire to expand and improve bicycle connections. References to specific locations for improvements are consistent because city bicycle plans were developed in coordination with the County of Napa.

CALTRANS

In its Draft Corridor Plan State Route 29 (2010), Caltrans made important bicycle and pedestrian recommendations including: constructing Class I multi-use paths on SR 29 right-of-way, planning and constructing a network of bike-ways connecting the Vallejo Ferry Terminal to just south to Calistoga.

VALLEJO

As discussed in the Roadway section, the Sonoma Boulevard Corridor Design Plan (Draft 2012) details the general location of land uses, streetscape design concepts, and proposed circulation patterns for all modes of transportation along Sonoma Boulevard. The Plan does provide some specific improvements for bicyclists. Continuous Class II bike lanes (northbound and southbound) are envisioned along the entire length of their study area from Curtola Parkway to Lewis Brown Drive just south of SR 37.

AMERICAN CANYON

The American Canyon Circulation Element (2013 update) contains high-level policies to promote bicycling, meet the mobility needs of all users, and develop a safe and efficient non-motorized circulation system. There is also a focus on maintaining and updating street standards that provide for "Complete Streets." The Circulation Element incorporates the County-wide Bicycle Master Plan and includes cross sections for SR 29 and each street and arterial classification, which includes a requirement for Class II bicycle lanes.

CITY OF NAPA

The local bicycle plan in the City of Napa supplements and incorporates the Napa Countywide Bicycle Plan. See discussion below.

NAPA COUNTY

The NCTPA Countywide Bicycle Plan (2012) was developed in collaboration with all cities in Napa County. The plan's objective is to establish a comprehensive, safe, connected countywide bicycle transportation and recreation system to support increases in bicycle trips made throughout the county to 10 percent of all trips by 2035. It intends to reach this goal by developing a local and countywide network connecting the communities, developing contiguous Class I pathways, and ensuring all transportation projects improve bicycle facilities.

Pedestrian Facilities

Existing Character and Performance

For the most part, SR 29 in the Study Area is not heavily used by pedestrians. However, especially within the city limits of American Canyon, the roadway also serves as a local street, and pedestrian access is important. Currently, pedestrian access along SR 29 in American Canyon is irregular and disconnected.

Future Improvements

Within American Canyon, future pedestrian improvements cited in the 2013 Circulation Element include up to three pedestrian bridges (potentially located at American Canyon Road, Donaldson Way, and Napa Junction Road).

Policy Context

The various plans summarized below express a similar desire to expand and improve pedestrian connections.

CALTRANS

In its Draft Corridor Plan State Route 29 (2010), Caltrans made pedestrian recommendations including: constructing Class I multi-use paths on SR 29 right of way; increasing sidewalk inventory on SR 29; studying pedestrian overcrossings in American Canyon; increasing infill development; and recommending sidewalks, countdown signals, and other pedestrian amenities where appropriate.

VALLEJO

As discussed above, the Sonoma Boulevard Corridor Design Plan (Draft 2012) details the general location of land uses, streetscape design concepts, and proposed circulation patterns for all modes of transportation along Sonoma Boulevard. The Plan does provide some specific improvements for pedestrians. New sidewalks and sidewalk widening are proposed along several sections of the corridor.

AMERICAN CANYON

The American Canyon Circulation Element (2013 update) contains high-level policies to promote walking, meet the mobility needs of all users, and develop a safe and efficient non-motorized circulation system. There is also a focus on maintaining and updating street standards that provide for "Complete Streets." The Circulation Element includes cross sections for SR 29 and each street and arterial classification, which include requirements for sidewalks. The Circulation Element also includes policies to develop and implement a Pedestrian Master Plan.

CITY OF NAPA

The City of Napa General Plan (2011 update) has a pedestrian services goal to provide an interconnected pedestrian network providing safe access between residential areas, public uses, shopping, and employment centers, with special attention to a high quality downtown pedestrian environment with links to neighborhoods.

Matrix of Applicable Policies

Policies with direct application to the SR 29 corridor are summarized in the following matrix and provide an at-a-glance resource. The matrix was also developed to help ensure that recommendations in this study conform with existing policies, unless non-conforming recommendations are critical to attaining corridor objectives. See Figure 2-11.

Figure 2-11: Existing Policy Matrix

POLICIES		VALLEJO	AMERICAN CANYON	CITY OF NAPA	COUNTY AND OTHER				Noted Conflicts
		Sonoma Blvd Corridor Design Plan (2013)	Circulation Element (2013)	GP (2011 update)	Napa County GP Circulation Element (2008)	Draft Corridor Plan SR29 (Caltrans, 2010)*	NCTPA Short Range Transit Plan (2013)	NCTPA Countywide Bike Plan (2012)	
Roadway	Specific	Reduction in automobile travel lanes or travel lane widths south of SR37	Widen the SR29 four-lane arterial to a six-lane arterial (from the southern to northern limits of the City)	Parallel route improvement - extension of Solano Avenue from Lincoln Street to 1st Street (west of SR29)	Roadway improvements relevant to our study, including: widen Jameson Canyon Road (SR12), interchange at the intersection of SR12, Airport Boulevard, and SR29, extension of Newell Road to Green Island Road, extension of Devlin Road between Soscol	Optimize signal timing for throughput at a safe speed			Some variations include the City of American Canyon's plan to increase the number of travel lanes on SR29 to three in each direction within the City boundary, the Sonoma Boulevard Corridor Plan recommendation for lane reductions or road diets in certain segments in Vallejo, and Caltrans recommendation of maintaining SR29 as a four-lane highway.
		Street reconfigurations	Completion of parallel routes, including Devlin Road, Newell Drive, South Napa Junction Road, and Commerce Boulevard			Study the concept of constructing an HOV lane from City of Napa to the Vallejo Ferry Terminal			
		Various land use development focuses				Utilize ITS as a key strategy for allowing throughput increases without adding lanes, including: increased driver information systems, advanced traffic signals, roadway and weather monitoring stations, highway advisory radio, closed circuit television cameras, and fiberoptic communication.			
	General		Design circulation system to discourage regional traffic from bypassing SR29 and impacting City streets.	Develop a transportation infrastructure that provides for an acceptable traffic flow and provides access to all destinations	Provide a roadway system that maintains current roadway capacities in most locations and is both safe and efficient in terms of providing local access	Note that this plan has been developed provisionally and will be revised to reflect the outcomes of this SR29 Gateway Corridor Study.	Service improvement for regional services included transfer location capital improvements, relocating the Highway 29 stop to allow the service to stay on route, and Highway 29 corridor improvements such as transit signal priority and queue jump lanes.		General consistency with improving the traffic congestion along the corridor while envisioning a more multi-modal, complete streets network.
			Explore a complete streets approach that will expand the travel capacity of SR29	Minimize the negative effects of additional automobile traffic and other transportation	Discourage increases in commuter traffic passing through the county on all roadways except I-80 by designing county roadways to meet local rather than regional needs and by supporting improvements to alternative facilities outside the County (e.g., State Route 37)		Marketing a distinct identity for the VINE to concentrate on increasing ridership, improving the customer experience and improving its image and appeal.		
			Maintain and update street standards that provide for "Complete Streets."						

* This refers to a preliminary draft document. Caltrans has updated its guidance on developing Transportation Concept Reports (TCRs) for State Routes and will be updating the SR 29 TCR after the Gateway Corridor Improvement Plan is adopted. Caltrans will use the Plan to inform the SR 29 TCR.

POLICIES		VALLEJO	AMERICAN CANYON	CITY OF NAPA	COUNTY AND OTHER			Noted Conflicts
		Sonoma Blvd Corridor Design Plan (2013)	Circulation Element (2013)	GP (2011 update)	Napa County GP Circulation Element (2008)	Draft Corridor Plan SR29 (Caltrans, 2010)*	NCTPA Short Range Transit Plan (2013)	
Transit	Specific	Transit amenities (e.g. bus shelters) along the corridor.	Build multi-modal transit center on SR29 within the designated Community Center or Town Center			The recommendation of an HOV lane (previously noted) was envisioned as a transit beneficial strategy.	In coordination with SR 29 Planning Study, identify improvements along Route 10 and 29 in American Canyon, which could include securing property for and opening Park and Ride lot(s) with the priority a Highway 29 location in American Canyon.	No inconsistencies
		Transit-oriented development node at Sonoma Blvd/Couch/railroad tracks					Creation of new Route 11 to serve southern Napa County with a link to the Vallejo Ferry Terminal	
	General		Provide transit linkages between the Community Center or Town Center and regionally-related transit such	Develop and maintain an efficient and convenient transit system with connections to Napa County	Promote the use of transit by visitors to Napa County.	Encourage use of excess right-of-way (ROW) for bus stops and Park & Ride facilities		The various plans show consistency with expressing the desire to expand and improve public transit, particularly emphasizing improving regional connections and utilizing public transit to reduce vehicle commute trips. The plans also emphasize the lack of funding available for improvements and tend to avoid making any specific recommendations.
			Continued collaboration with other agencies and jurisdictions to promote local and regional public transit.	Increase transit mode split to five percent by 2020	Work with NCTPA to conduct regular reviews of public transit use and opportunities for its expansion in Napa County	Increase the reliability and frequencies of existing public transit (particularly VINE route links to the Vallejo Ferry Terminal)		
			Expand and improve local transit operations, the City's demand-responsive transit system, and maintaining consistency with the NCTPA Congestion Management Plan	Locate bus routes within ¼ mile of 85 percent of city residences (90 percent of city activity centers)		Upgrade mass transit services (consider lane additions, bus rapid transit, parallel routes in the southern county and Jameson Canyon)		
				Operate at half-hour intervals for 60 percent of bus routes				

POLICIES		VALLEJO	AMERICAN CANYON	CITY OF NAPA	COUNTY AND OTHER				Noted Conflicts
		Sonoma Blvd Corridor Design Plan (2013)	Circulation Element (2013)	GP (2011 update)	Napa County GP Circulation Element (2008)	Draft Corridor Plan SR29 (Caltrans, 2010)*	NCTPA Short Range Transit Plan (2013)	NCTPA Countywide Bike Plan (2012)	
Multimodal	General	Create an improved and environmentally sustainable streetscape area; and implement a cohesive approach to enhance the character and development of the corridor	High level policies to promote walking and bicycling, meet the mobility needs of all users, and develop a safe and efficient non-motorized circulation system.	Create a multi-modal citywide transportation system	Promote transit-oriented development in existing municipalities and urbanized areas	Increase multi-modal mode share in the full length of the corridor			The various plans show consistency with expressing the desire to focus on multi-modal planning.
					Reduce the percentage of work trips that are by private, single-occupant vehicles by 2030 such that Napa County's percentage decreases to 50 percent.	Promote increased housing density and transit-oriented development along the corridor			
					Encourage implementation of transportation demand management programs with the County of Napa and other major employers.				
					The County supports a coordinated approach to land use and circulation planning to promote a healthier community by encouraging walking, bicycling, and other forms of transportation which decrease motor vehicle use.				
					The County shall work with the incorporated cities and town, the Napa County Transportation and Planning Agency, and Caltrans to develop a coordinated approach to roadway design to enhance driver and pedestrian safety, particularly for children and senior citizens.				

POLICIES		VALLEJO	AMERICAN CANYON	CITY OF NAPA	COUNTY AND OTHER			Noted Conflicts
		Sonoma Blvd Corridor Design Plan (2013)	Circulation Element (2013)	GP (2011 update)	Napa County GP Circulation Element (2008)	Draft Corridor Plan SR29 (Caltrans, 2010)*	NCTPA Short Range Transit Plan (2013)	
Bicycle	Specific	Continuous Class II bike lanes (northbound and southbound) are envisioned along the entire length of their study area from Curtola Parkway to Lewis Brown Drive just south of SR37.	Provide bicycle facilities as documented in the bike plan.	Develop bicycle routes highlighted on the City's bicycle route map (e.g., developing Vine Trail (Class I), Class II bike lane along SR121 to SR221), etc.)	The County shall work with Caltrans and other agencies to construct or designate approximately 40 miles of additional bicycle lanes in Napa County by 2030, consistent with priorities identified in the Napa Countywide Bicycle Master Plan.	Class I multi-use paths on SR29 right-of-way	Vine Trail – provide a continuous Class I multi-use path between the communities of Napa County and the Vallejo Ferry Terminal (running along SR29 in the City of Napa, then crossing the City to run east along Napa River, and then continue on Devlin Road into American Canyon to the Ferry Terminal)	The various plans show consistency with expressing the desire to expand and improve pedestrian and bicycle connections. Where specifics are provided, the plans are consistent since the city bicycle plans were developed in coordination with the County of Napa.
				Pursue completion of the Napa Valley Vine Trail, Bay Trail, and Ridge Trail.			Class II Bike Lane along SR121 to SR221 to SR29 into American Canyon	
							Two parallel Class I multi-use paths parallel to SR29 from Unincorporated Napa County into American Canyon reconnecting to the proposed Vine Trail (along Airport Blvd and South Kelly Road)	
							Additional Class II and Class III bicycle facilities within the City of Napa and American Canyon which help close route gaps	
	General		High level policies to promote walking and bicycling, meet the mobility needs of all users, and develop a safe and efficient non-motorized circulation system.	Establish a comprehensive, safe, connected countywide bicycle transportation and recreation system to support increases in bicycle trips made throughout the County to 10 percent of all trips by 2035.	Install safety improvements on rural roads and highways throughout the county including but not limited to new signals, bike lanes, bikeways, shoulder widening, softening sharp curves, etc.	Plan and construct a network of bikeways connecting the Vallejo Ferry Terminal to just south to Calistoga	Develop and maintain a safe and comprehensive countywide bicycle transportation and recreation system that provides access, opportunities for healthy physical activity, and reduced traffic congestion and energy use.	The various plans show consistency with expressing the desire to expand and improve pedestrian and bicycle connections.
Pedestrian	Specific	New sidewalks and sidewalk widening are proposed along several sections of the corridor.	Pedestrian bridges at American Canyon Road, Donaldson Way, and Napa Junction Road.			Class I multi-use paths on SR29 right-of-way		The various plans show consistency with expressing the desire to expand and improve pedestrian and bicycle connections.
	General		High level policies to promote walking and bicycling, meet the mobility needs of all users, and develop a safe and efficient non-motorized circulation system.	Pedestrian services goal to provide an interconnected pedestrian network providing safe access between residential areas, public uses, shopping, and employment centers, with special attention to a high quality downtown pedestrian environment with links to neighborhoods.		Increase sidewalk inventory on SR29		The various plans show consistency with expressing the desire to expand and improve pedestrian and bicycle connections.
						Study pedestrian overcrossings in American Canyon		
			Establish a requirement for sidewalks on all arterial and collector streets			Recommend sidewalks, overcrossings, countdown signals, other pedestrian amenities where appropriate.		
			Develop and implement a pedestrian master plan.					

3 VISION

ROLE OF THE VISION

The SR 29 Gateway Corridor Improvement Plan consisted of two major phases: visioning and implementation, the results of which are combined to create the final Corridor Plan.

This chapter describes the results of the visioning phase, which produced a long-term high-level vision for the corridor based on community preferences and regional transportation needs. It consists of an overall vision statement, guiding principles, and objectives that describe general goals for transportation across all modes, as well as organizing concepts for long-term character of improvements along the corridor.

Guiding principles and objectives were drafted to define overarching goals before focusing on specific design options and other recommendations. The draft principles and objectives build on adopted local policies and reflect common themes that emerged at the following meetings and workshops:

- Community workshops on November 13 and 29, 2012
- Phone interviews conducted on January 16-19, 2013
- The Citizens Advisory Committee on December 19, 2012 and February 6, 2013
- Staff Working Group on August 30, 2012 and February 21, 2013
- The Corridor Steering Committee on November 16, 2012; and March 21, 2013

All roadway types described in the Vision can be designed in ways that can handle preliminary estimates of future traffic volumes in the corridor. There is a wide range of design options associated with each of the roadway types considered, which were then explored and developed in more detail after a general direction for the corridor was established. After input on design options was received, traffic modeling was conducted to ensure that adequate capacity is provided and designs refined to optimize performance across all modes.



In-depth analysis of design options and detailed traffic modeling occurred following adoption of the Vision by the Corridor Steering Committee (CSC). The proposed program of improvements that resulted from this stage is described in Chapter 4.

INPUT TO THE VISION PLAN

The Vision is a community-based product of several months of public input and focused review by the various committees associated with the SR 29 Gateway Corridor Improvement Plan. The following summary describes how community engagement formed the basis for the Vision, as well as the specific input provided by the Community Advisory Committee and the Staff Working Group.

Community and Committee Involvement

Visioning Workshops

Two community visioning workshops were held in November 2012 to solicit input on the SR 29 Gateway Corridor Improvement Plan. The workshops were designed to engage a diverse set of community members representing a range of interests. The workshops provided opportunities for discussion and direct input relating to the development of a “Vision Plan” for the corridor.

Over fifty community members participated between the two workshops. The first workshop was held in American Canyon on November 13, 2012; 29 community members attended, and most were American Canyon residents. The second workshop was held in the city of Napa on November 27, 2012; 22 community members attended with participants split between Napa and American Canyon as their place of residence.

Participants identified many common themes surrounding the performance and character of the corridor, including the conflict between local and regional through traffic; a desire for improved pedestrian and bicycle access; the importance of beautification and community identity; and the challenges of reducing automobile congestion. These themes directly informed the guiding principles and objectives presented in the Vision.

Workshop participants also took part in a mapping exercise, in which they were given stickers representing different roadway types and other transportation-related amenities (trails, pedestrian crossings, etc.). In small groups, participants placed the stickers on a large map of the corridor to illustrate their desired roadway character and potential improvements. A synthesis of the small groups’ maps and sticker placements formed the basis of the Highway Character Diagram (Figure 3-1) presented in this chapter.

Workshop Ideas

Community members who participated in the two visioning workshops reached a significant level of agreement, as noted above and highlighted below. The Citizens Advisory Committee and the Staff Working Group both offered ideas for components to be included within a long-term Vision Plan for the addressing the highway's design and community character. Many, but not all, are part of the final vision. A full summary of the workshops is provided in Appendix A.

ELEMENTS THROUGHOUT CORRIDOR

- Provide parallel routes for pedestrians and bicyclists, which may or may not be within the highway right-of-way, as is appropriate.
- Examine whether parallel local routes can provide alternative routes to residents, without attracting through-traffic in residential neighborhoods.
- Serve surrounding uses of sufficient intensity with well-located bus stops.

SEGMENT 1: SOUTH OF HIGHWAY 37

- Defer to Sonoma Boulevard Specific Plan for highway improvements and community character.
- Examine methods to speed bus transit service to and from the Vallejo Ferry Terminal, including along routes in addition to SR 29.
- Strengthen the ferry terminal as a regional transit hub.

SEGMENT 2: HIGHWAY 37 TO JUST SOUTH OF AMERICAN CANYON ROAD

- In the southbound direction, where residential uses are adjacent to the roadway, develop a Parkway with landscaping and bicycle/pedestrian paths along the right-of-way but buffered from traffic.
- In the northbound direction, develop options for a Boulevard that allows local access to current and future businesses and creates a pedestrian-oriented environment along the highway.
- Design a “gateway” to American Canyon and the Napa Valley.
- Examine demand for pedestrian crossings (none identified during workshops), as well as their location and type.
- Accommodate a park and ride transit node near the convergence of SR 29 and SR 37.

SEGMENT 3: JUST SOUTH OF AMERICAN CANYON ROAD TO NAPA JUNCTION ROAD

- Consider the appropriate balance between users making regional trips versus users making local trips and local connectivity.
- Recommend specific locations for pedestrian/bicycle crossings at-grade and bridges, such as at American Canyon Road, Donaldson Way, Napa Junction Road and the High School.
- Further research the issues and costs involved in creating grade separated intersec-



tions at the major SR 29 crossings in American Canyon.

- Create scenic trails with views of San Pablo Bay.
- Develop options for a Boulevard to allow local access and create pedestrian-oriented environments along the highway to be developed further.

SEGMENT 4: NAPA JUNCTION ROAD TO JUST SOUTH OF SR 12

- Create a Parkway with landscaping and other features that gives this employment area a distinct identity.
- Strive to maintain the rural character of this segment, especially to the east.
- Provide a pedestrian at-grade crossing or bridge at SR 12 and at Green Island Road.
- Locate bus stops to serve employers. Consider establishing a transit park and ride facility near Napa County Airport.
- Provide bicycle/pedestrian trails parallel to the Corridor, with good connections to employers.
- Create scenic trails with views of San Pablo Bay, if possible.

SEGMENT 5: JUST SOUTH OF SR 12 TO URBANIZED CITY OF NAPA

- Maintain a similar look and feel to current conditions. Recognize rural character as important to the identity of the Napa Valley, and tourism in the area.
- Provide a separated trail system parallel to the Corridor. Address how the trail crosses the Napa River.
- Address functionality of intersection of SR 29 with SR 12/I21.
- Major intersection treatments at SR29 and SR221 (Soscol Flyover)
- Major intersection treatment at SR29 and SR12/Airport Blvd

SEGMENT 6: FREEWAY IN URBANIZED CITY OF NAPA

- Maintain this segment as a limited-access freeway.
- Enhance this segment with additional landscaping and special features to better create a “gateway” to the city and valley beyond.
- Address functionality of First Street/SR 29 interchange.

ILLUSTRATIONS

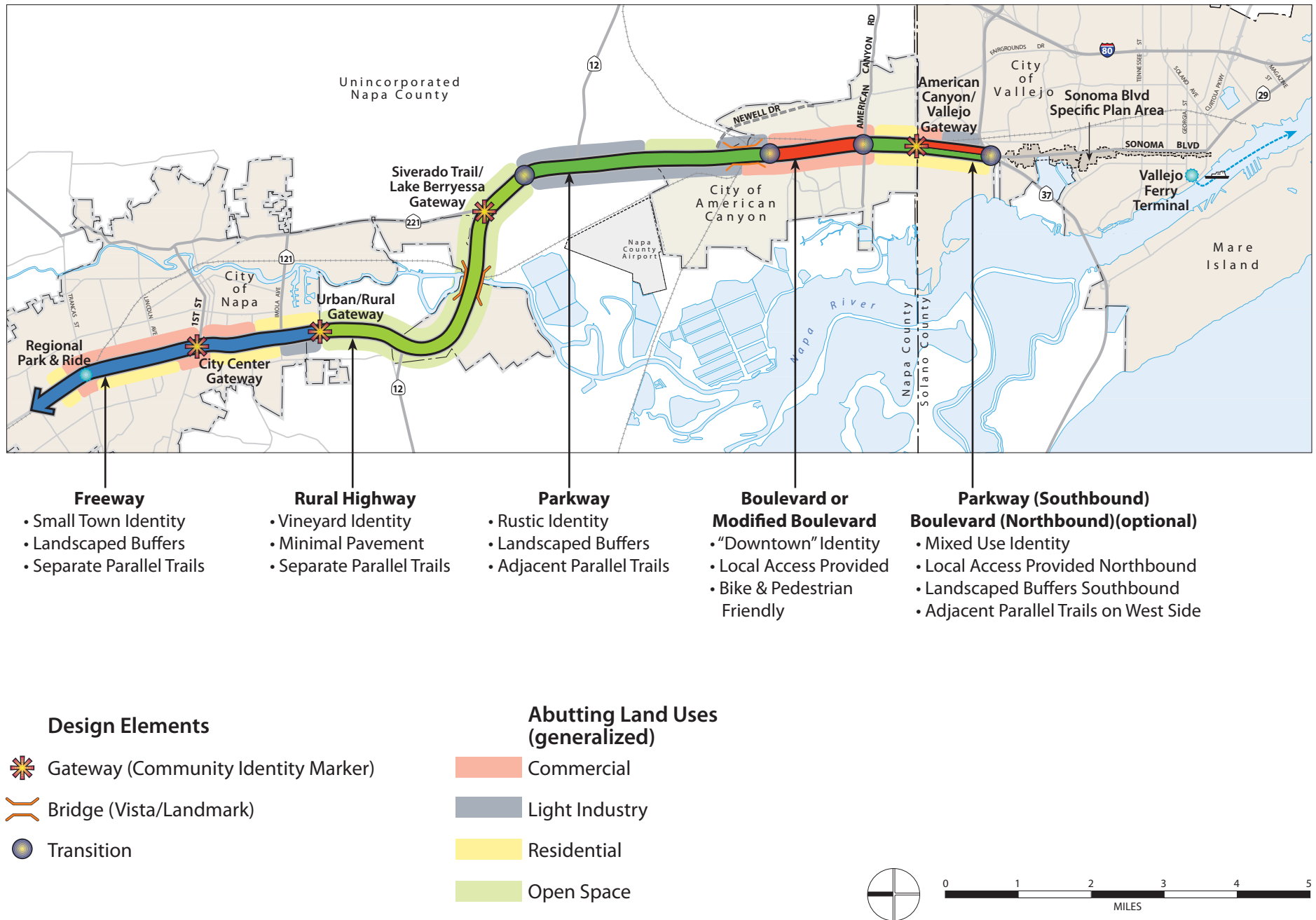
Figure 3-1, the Highway Character Diagram, shows conceptually the elements of the Draft Vision Plan described in the previous section. The diagram illustrates and describes the roadway type, key character elements, and generalized adjacent land uses for each segment. Gateways/Community Identity Markers and transition points between segments are also shown.

This diagram is a general, “high level” visual representation of the ideas expressed in the Vision, which helped to guide the development of specific roadway modification options that can implement the specific recommendations. Chapter 4, Proposed Program, describes the specific program and improvement options that were tested and recommended following development of the Vision.

Citizens Advisory Committee

The feedback from the workshops was presented to the Citizens Advisory Committee (CAC) on December 19, 2012; the CAC was asked to affirm the general vision for the corridor that resulted from the workshops. Then, the first draft of the Vision Plan was presented to the CAC on February 6, 2013. The CAC engaged in a discussion in which members provided specific feedback on the draft, which the consultant team used to refine the document before presenting it to the Staff Working Group.

Figure 3-1: Highway Character Diagram



Key contributions on the Draft Vision Plan included:

- Clarifying that any identified parallel routes to SR 29 through American Canyon should be designed for local use and access, rather than as a regional highway bypass
- Including passenger rail as a potential future mode for the corridor
- Ensuring that the conceptual roadway types shown on the Highway Character Diagram can actually support the amount of automobile traffic projected for the corridor

Staff Working Group

The Staff Working Group (SWG) reviewed the Draft Vision Plan on February 21, 2013. The draft plan at this point incorporated the changes suggested by the CAC earlier in the month. In a similar format to the CAC meeting, the SWG discussed the emerging Vision and its various principles and objectives, and provided additional feedback that has now been incorporated into this document for presentation to the Corridor Steering Committee.

Key contributions of the SWG included:

- Changing the proposed roadway type for the segment between Highway 37 and the American Canyon city limits to be designated as a parkway in the southbound direction (adjacent to existing residential areas) and a boulevard in the northbound direction (to provide better local access to current and future commercial developments)

- Amending the adjacent land uses shown on the Highway Character Diagram for the segment in the City of Napa to better reflect the existing mix of land uses
- Recognizing that while there is a strong desire to have a separate bikeway along the corridor (e.g. the Vine Trail), Caltrans has a commitment to accommodating bicycles within the right of way as well (except where it is a freeway)
- Ensuring that roundabouts are discussed as a possible roadway improvement
- Changing wording from “accommodating” alternative modes to “promoting” alternative modes
- Separating out the discussion of various non-automobile modes of travel, rather than treating them all as one category

In summary, input from community members directly informed the development of the initial Draft Vision Plan, which was then reviewed and refined by the CAC and the SWG. The key changes described above from the SWG and the CAC, as well as additional minor revisions for clarity, were incorporated into the Vision Plan for presentation to the Corridor Steering Committee (CSC).

VISION STATEMENT, GUIDING PRINCIPLES, AND OBJECTIVES

The Vision Statement, Guiding Principles, and Objectives below resulted from the community process and guided the formulation of specific recommendations and improvements for the corridor.

Vision Statement

Enhance mobility along the SR 29 Corridor, while ensuring that improvements are sensitive to adjacent land use and development context. Undertake strategic improvements to reduce automobile congestion and minimize delays. Identify opportunities for transit and passenger rail, and provide for bicycle and pedestrian access and safety along and across the corridor. Maintain local access and enhance the identity and distinctiveness of the corridor.

Guiding Principles and Objectives

Guiding principles (numbered) outline actions to achieve desired outcomes. Objectives (lettered) describe general strategies. Recommendations for design and performance improvements and transportation programs made during the next phase of the project are intended to implement these guiding principles and objectives.

1. *Undertake improvements to reduce congestion and delays along the SR 29 Corridor, while balancing the corridor's role as both a regional and a local route through American Canyon and Vallejo.*
 - a. Undertake improvements to the corridor to reduce vehicular delays and congestion, especially during the peak hours. Add new lanes, improve intersections and consider other measures to optimize the mobility of people and vehicles along the corridor.
 - b. Consider best practices and technologies, including but not limited to express lanes, roundabouts where appropriate, and synchronized traffic lights, to maximize operational efficiencies.
 - c. Prioritize capacity increase (vehicles per hour) over high vehicle speeds, especially along stretches such as through the American Canyon Priority Development Area (PDA), where local access is desired.
 - d. Avoid overbuilding. Consider cost of widening the highway. Recognize that the congestion problems usually occur only during commute hours.

2. *Develop solutions that are context sensitive.*
- a. Ensure that planned improvements are sensitive to and respectful of the plans and desires of local communities.
 - b. Develop varied solutions—such as boulevard, parkway, and landscaped rural highway—appropriate to adjacent land uses and conditions.
 - c. Enhance corridor identity as a principal “Gateway” to the Napa Valley.
 - d. Seek to provide frontage roads in the American Canyon PDA, potentially with parking along some stretches, to enhance access to businesses and other developments and ease of movement for local traffic.



3. *Reduce motorists' need to use SR 29 by managing demand and encouraging use of alternative/parallel routes for local trips.*
- a. Promote alternatives to traveling in single-occupant vehicles by promoting public transit, park and ride facilities, carpooling/vanpooling, bicycle use and walking.
 - b. Promote transportation demand management programs such as alternative work schedules and telecommuting, especially among major employers.
 - c. Support local and regional growth management efforts to reduce future travel demand along the corridor, such as by balancing jobs and housing.
 - d. Encourage motorists to make trips along the corridor during off-peak rather than peak travel times.
 - e. Encourage development of local-serving routes that will give residents alternatives to SR 29 for local trips.



4. *Expand the network of pedestrian paths and supporting infrastructure to provide convenient routes to work, schools, open space, and commercial destinations.*
- a. Create continuous pedestrian facilities along both sides of SR 29. Where the roadway is designated as a Boulevard, these should be sidewalks; where the roadway is designated as a parkway or a rural highway, these may be on multi-use paths adjacent to the highway. Pedestrian facilities on parallel facilities may also be offered.
 - b. Provide safe pedestrian crossings in convenient locations. Study whether at-grade crossings or pedestrian bridges are more appropriate based on whether pedestrians will use the facility as intended and implications for traffic congestion.
 - c. Create a pedestrian-oriented environment and improve streetscapes, ensuring full access to and between public areas and private developments.



5. *Expand the network of bicycle paths and supporting infrastructure to provide convenient access to destinations, and promote travel by bicycle as a viable alternative to the automobile.*
 - a. Provide continuous bicycle access within the SR 29 right of way, per Caltrans' standards, except where the roadway is a limited-access freeway.
 - b. Where practical and consistent with plans for the Vine Trail, create additional bicycle routes parallel to, but separate from, the SR 29 right of way. Prioritize creation of Class I multi-use paths that cater to recreational bicyclists.
 - c. Ensure that bicycle travel is facilitated by clear signage and wayfinding elements, focusing on providing guidance where the bicycle paths intersect with highway interchanges and other similarly complex natural or manmade features.
6. *Maintain the safety, health and livability of local communities, especially adjacent residential areas.*
 - a. Calm traffic on local routes that parallel SR 29.
 - b. Preserve and accentuate unique and desirable community character and the existing quality of life in adjacent neighborhoods.
7. *Promote convenient and reliable public transit to encourage its use by commuters and to provide reasonable options for getting to local destinations.*
 - a. Minimize transit travel times with improvements and operational technologies, such as deploying methods that prioritize bus movement along the corridor and potential Bus Rapid Transit service.
 - b. Support convenient access to transit where homes and jobs are concentrated.
8. *Use highway improvements to enhance community character and promote economic development.*
 - a. Design highway improvements to complement and support the envisioned character of corridor segments, as indicated by the Highway Character Diagram (Figure 3-1).
 - b. Where the corridor is designated as a "freeway," improvements should:
 - Incorporate landscape features and motifs that are similar to what those associated with Napa Valley vineyards and heritage roadways;
 - Ensure that adequate visual and traffic noise barriers from adjacent development are provided, and that these barriers are designed with a high level of aesthetic consideration; and



Photo credits: NCTPA (above) and Napa Valley Vine Trail (below)

- Provide additional and continuous bicycle and pedestrian access outside of, but parallel to and in close proximity to, the highway right of way. Bicycles and pedestrians are not allowed on the freeway.
- c. Where the corridor is designated as a “rural highway,” improvements should:
- Incorporate landscape features and motifs that are similar to what those associated with Napa Valley vineyards and heritage roadways;
 - Minimize use of more pavement than is functionally necessary;
 - Allow bicycle access within the highway right of way, at a safe distance from automobile traffic; and
 - Provide additional continuous and parallel multi-use trails, although these may be at a distance from the highway.
- d. Where the corridor is designated as a “parkway,” improvements should:
- Create and maintain bicycle-pedestrian trails parallel to and within and/or adjacent to the highway right-of-way;
 - Provide a landscaped buffer between trails and traffic;
- Provide a landscaped buffer between trails and abutting uses; and
 - Use design features and motifs along that complement and highlight the unique character of the different parkway segments that will occur, as are generally described in the Highway Character Diagram.
- e. Where the corridor is designated as a “boulevard:”
- Provide an attractive pedestrian route along the outside edge of the highway that encourages development to have entrances that front onto the boulevard;
 - Ensure that safe and convenient bicycle routes are provided within the highway right-of-way; and
 - Ensure that street trees, light standards and furnishings create an urban environment supportive of adjacent mix of uses and higher development intensities.
- f. Create unique “gateways” at key entrances to communities, districts, and along the Napa Valley Vine Trail. Use landscaping, public art and signage to accentuate gateways in context-sensitive ways.
- g. Through design treatment—such as gateway landscaping, lighting, signs and banners—highlight the bridges along SR 29 (i.e. the Napa River crossing) to be landmarks that heighten awareness of their vistas and geography.
- h. Design improvements and operations to support land use patterns on adjacent properties, consistent with local policies and regional planning goals.
- i. Implement procedures to ensure ongoing dialogue and consultation as highway designs are developed among local jurisdictions, Caltrans, and NCTPA.
- j. Minimize negative economic impacts during the construction of improvements.
9. *Support planned development activities.*
- a. Use highway improvements to encourage compact development along the corridor in locations consistent with local general plans and where transit service may be provided.
- b. In urban locations, encourage building and site design that helps create pedestrian environments that are attractive and safe.
- c. Filter pollutants from urban and highway runoff with green infrastructure, especially by using features that incorporate attractive paving and landscaping.

4 PROPOSED PROGRAM

This chapter contains detailed recommendations for proposed modifications along the SR 29 corridor, consistent with the Vision outlined in Chapter 3. Improvements that address all modes of travel—automobile, transit, bicycle, and pedestrian—are described and illustrated for major segments and key intersections. Each includes a description of:

- Current conditions;
- Alternatives considered (if applicable);
- Proposed improvements;
- Projected operations and performance assessment; and
- Design considerations and any physical or infrastructure constraints (if applicable).

Plan and section diagrams, photos, three-dimensional illustrations, and other graphics provide additional guidance and illustrate desired outcomes.

These recommendations collectively form the basis for preliminary cost estimation, financing, and other implementation actions to be undertaken by NCTPA and other participating jurisdictions.

METHODOLOGY

Travel Demand Forecasting

SR 29 draws vehicular traffic from all across the region; therefore a multi-county model that tracks trips from the region and accounts for land use changes both in and outside of Napa County was best suited for this study. The Napa-Solano Travel Demand Model (N-STDm) was the most appropriate tool to perform traffic forecasting for the SR 29 corridor.

To ensure the most recent land use and network inputs in the study area were represented in the N-STDm, Fehr & Peers reviewed relevant data sources: the American Canyon General Plan Circulation Element Update (2012), MTC's Transportation 2035 Plan for the San Francisco Bay Area (2009), the Napa County General Plan (2009), and ABAG's 2011 SCS Preferred Land Use Scenario. Fehr & Peers incorporated the assumptions from those studies for use in this analysis to ensure that the modeling reflected the latest and most accurate land use and transportation network assumptions. For further detail on how the N-STDm was updated for this study, please refer to Appendix B.

Existing and future traffic volumes were used to assess corridor performance, though the focus of the analysis was on intersection operations, as these are the greatest sources of traffic bottlenecks along the corridor. Modeling outputs for all of the intersections along the corridor are included in Appendix C. Each of the output sheets includes a variety of metrics for the AM and PM peak hours and for each direction and turning movement; summary information (such as overall average delay and LOS) is at the bottom of each sheet.

Right of Way Mapping

Caltrans provided their Right-of-Way Record Maps and available improvement plan documents covering the entire length of the Study Corridor. The maps range in age from over 70 years old to as recent as 2011, with the majority being last updated in the 1990s. While most are Right-of-Way Record Maps, there are improvement plans from 1943, updated last in 1973, from just south of Kimberly Drive in American Canyon to just north of Fagan Creek in Napa County, totaling approximately four miles. Additionally, some Right-of-Way Record Maps contain detailed information about improvements existing at the time of mapping.

Figure 4-1: Key Map

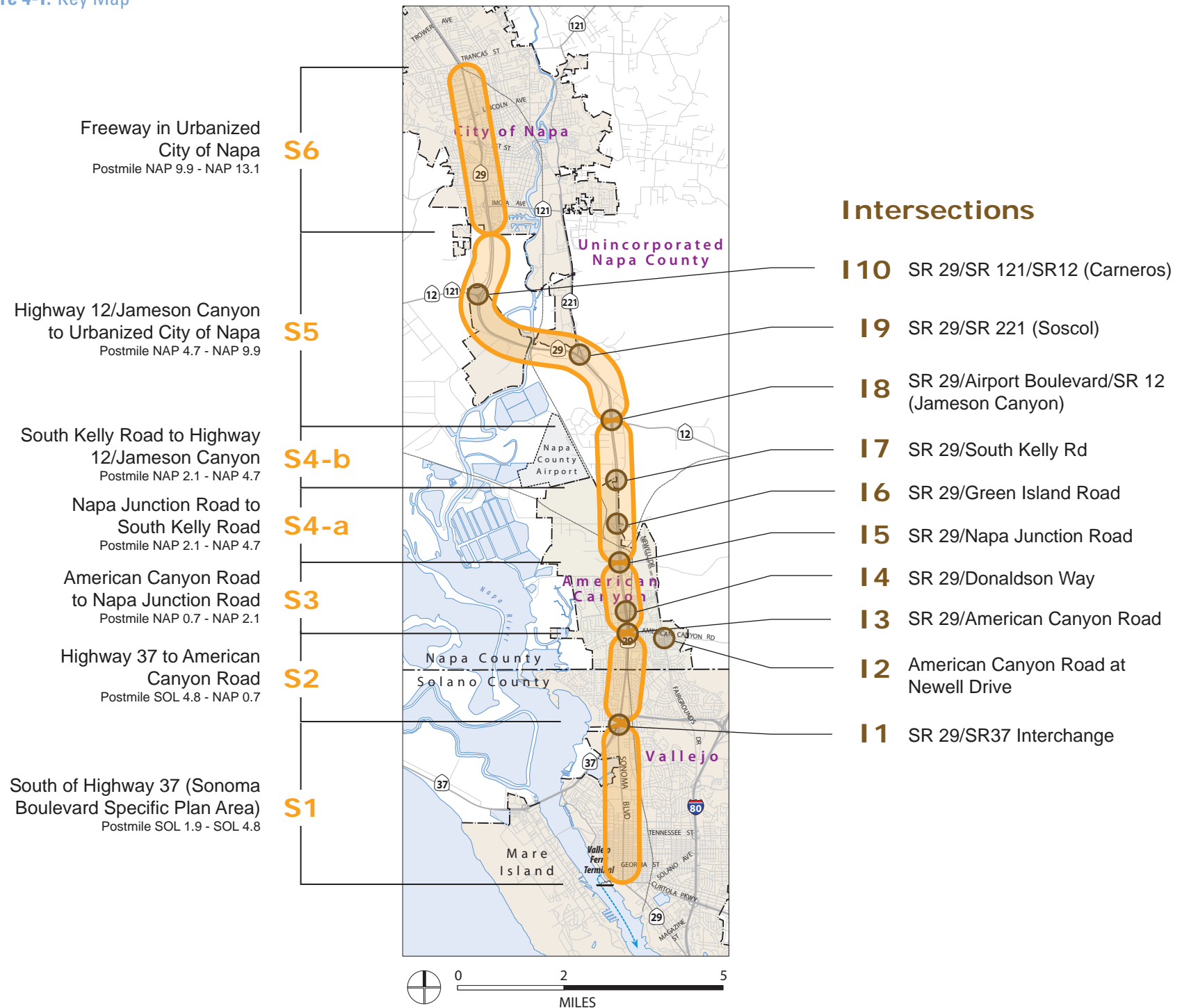
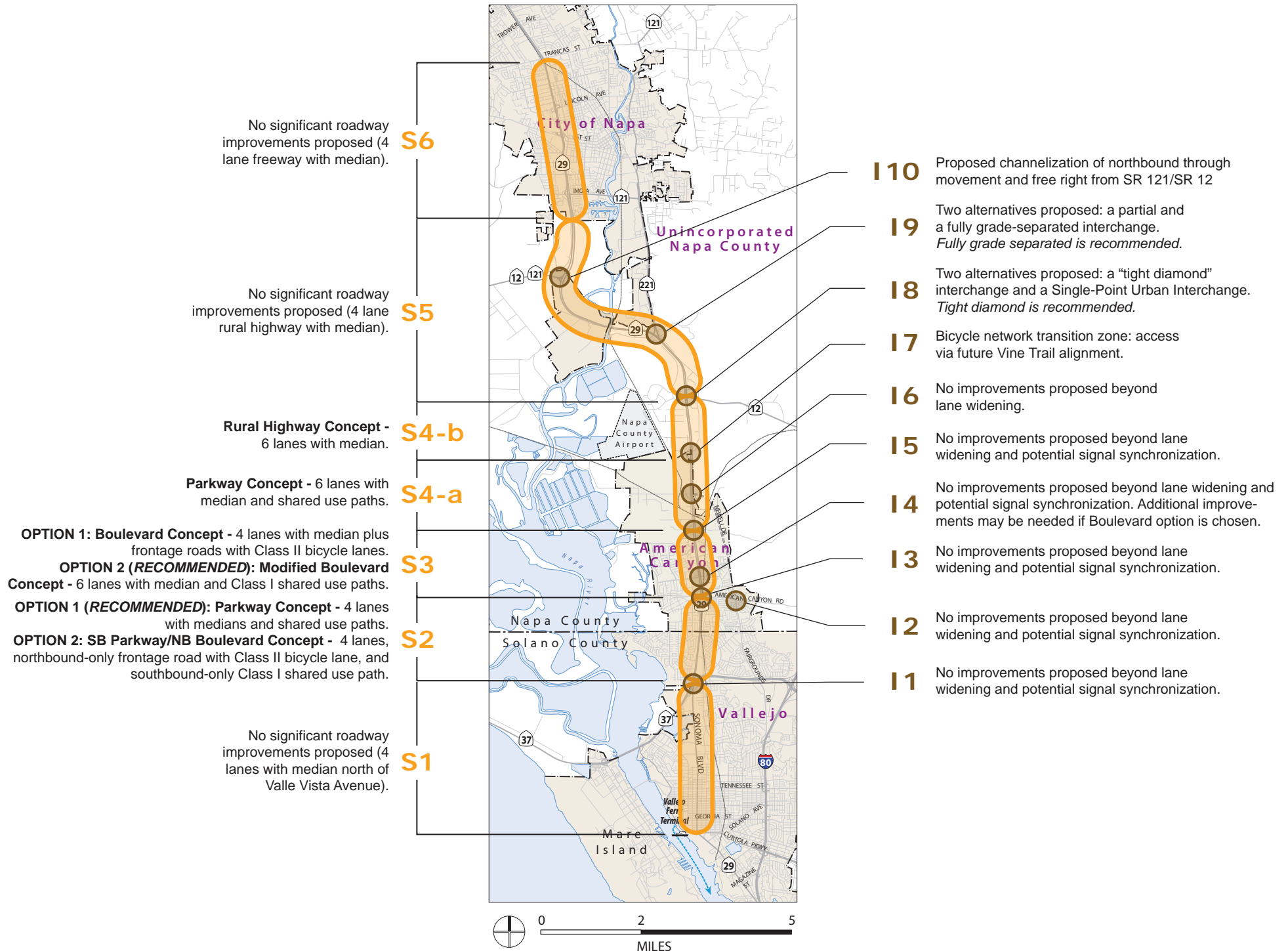


Figure 4-2: Summary of Proposed Improvements



IMPROVEMENTS BY SEGMENT AND INTERSECTION

This section describes the recommended improvements by roadway segment and major intersection. Each segment and intersection is demarcated in Figure 4-1, which provides a key map for the entire study corridor. Figure 4-2 illustrates all of the proposed improvements, summarizing the recommendations for the corridor. Each of these is described in more detail in the sections that follow. Improvements are described from south to north, beginning in the City of Vallejo and ending in the City of Napa.

Segment 1: South of SR 37 (Vallejo)

South of SR 37, where SR 29 is known as Sonoma Boulevard in the City of Vallejo, this study defers to the Sonoma Boulevard Specific Plan, which is underway. Figure 4-3 shows this section of the corridor. While the plan is not yet finalized or adopted, it is assumed that recommendations for the roadway corridor will be based on the Corridor Design Plan, which preceded the Specific Plan and outlined guiding principles, general goals and objectives for the corridor.

Transportation and urban design analysis completed for Sonoma Boulevard suggests that the roadway will not be widened in this section; rather, improvements to the corridor will focus on streetscape and enhancements to multimodal mobility.

Ultimately, the Sonoma Boulevard Specific Plan will also have its own implementation plan and financing strategy, thus this study does not include cost estimation or financing for this part of the corridor.

Segment 2: SR 29 from SR 37 to American Canyon Road (Vallejo and Southern American Canyon)

Current Conditions

SR 29 and SR 37 intersect at a grade-separated interchange (Intersection 1), with SR 37 providing access to Interstate 80 to the east and Marin County to the west. North of the interchange, SR 29 is a four-lane highway with an unlandscaped median. No sidewalks are provided, and while bicycles are permitted on the roadway, there are no striped bike lanes.

This segment of SR 29 currently sees between 2,000 and 3,000 vehicles in each direction during the peak hours on weekdays, resulting in a roadway LOS of F. At the same time, the interchange at Highways 37 and 29 (Intersection 1) performs at acceptable levels of service in the AM and PM peak hours (LOS A and B, respectively).

With the exception of the area around the SR 37 interchange, the right of way in this segment is 140 feet until Kimberly Drive. North of Kimberly Drive, there is some variation from 140 to 130 feet.

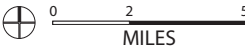
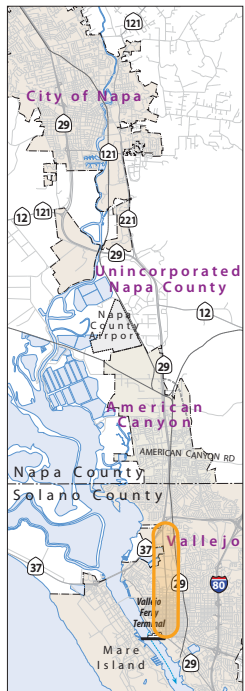
Alternatives Considered

Two options were considered for this segment, both of which are consistent with the Vision Plan and focus on improving multimodal accessibility and aesthetics of the roadway.

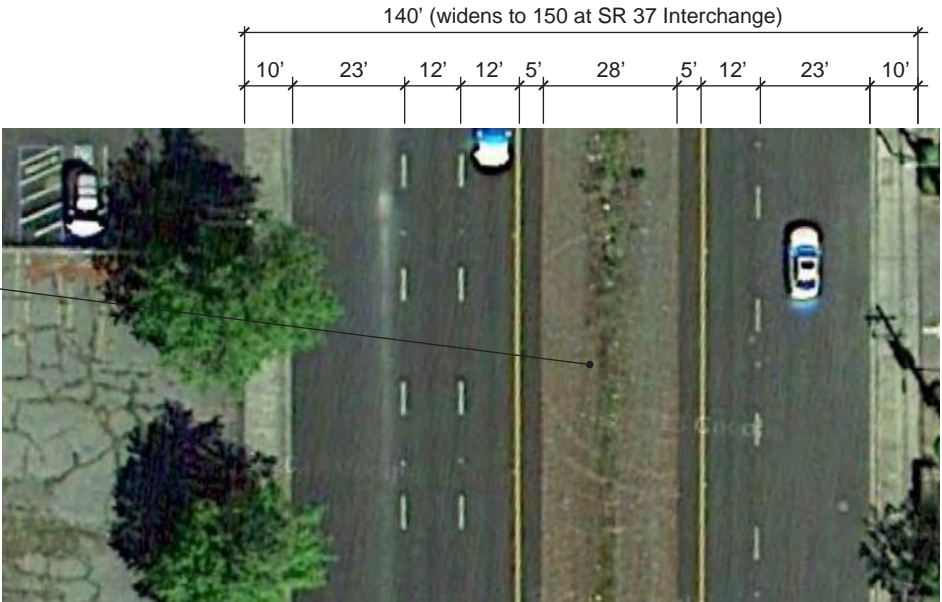
Option 1 envisions the roadway as a parkway, remaining at four lanes. A 12-foot wide Class I shared use path would be added on each side of the road, separated from the vehicle travel lanes by a planting strip. The planting strip and the central median would be landscaped with trees. Figure 4-4 shows existing and proposed conditions under Option 1, and Figure 4-5 shows a section diagram of Option 1.

Option 2 modifies the Parkway design such that in the northbound direction only, the roadway would be designed as a boulevard. One local access lane would be provided in addition to two through traffic lanes. In this direction, a Class II on-street bike lane and a sidewalk would replace the Class I shared use path. Figure 4-6 shows existing and proposed conditions under Option 2, and Figure 4-7 shows a section diagram of Option 2. Option 2 was proposed in order to provide better access to future development on the large vacant parcel on the east side of SR 29, bounded by SR 29, Mini Drive, Broadway Street, and the existing Food 4 Less grocery store. If development on this parcel were to be designed to face SR 29 and have a pedestrian orientation, the boulevard design of the roadway would better support this type of urban form.

S1 South of SR 37



Median north of Valle Vista Avenue only

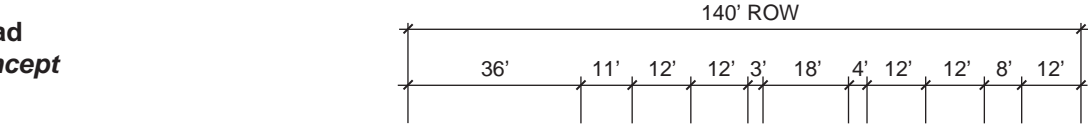
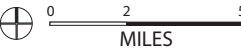
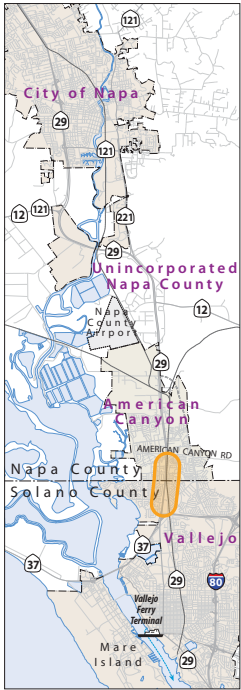


Existing Conditions

Future conditions defer to the Sonoma Boulevard Specific Plan; improvements will focus on streetscape and multi-modal improvements.

Figure 4-4: Existing and Proposed Conditions - Section 2 Parkway Concept

S2 SR 37 to American Canyon Road
Option 1 - Vallejo Parkway Concept

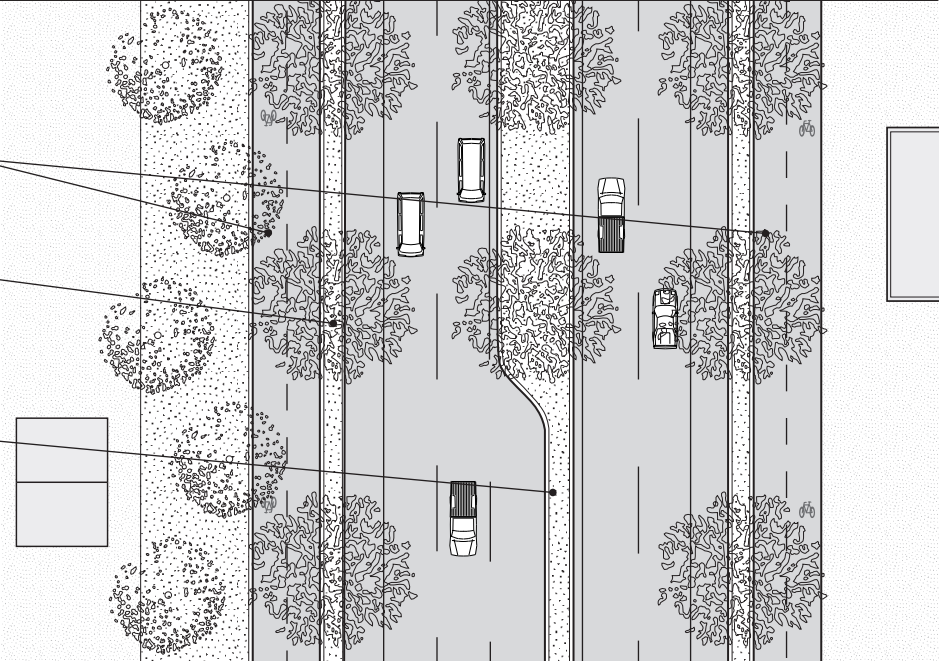


- No sidewalks
- No bicycle lanes
- No trees in median



Existing
Proposed

- Shared use paths; bikeways may be striped separately
- Larger trees may require design exception
- Pedestrian refuge at intersections



1" = 40'

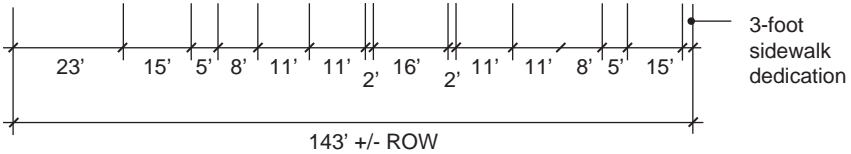
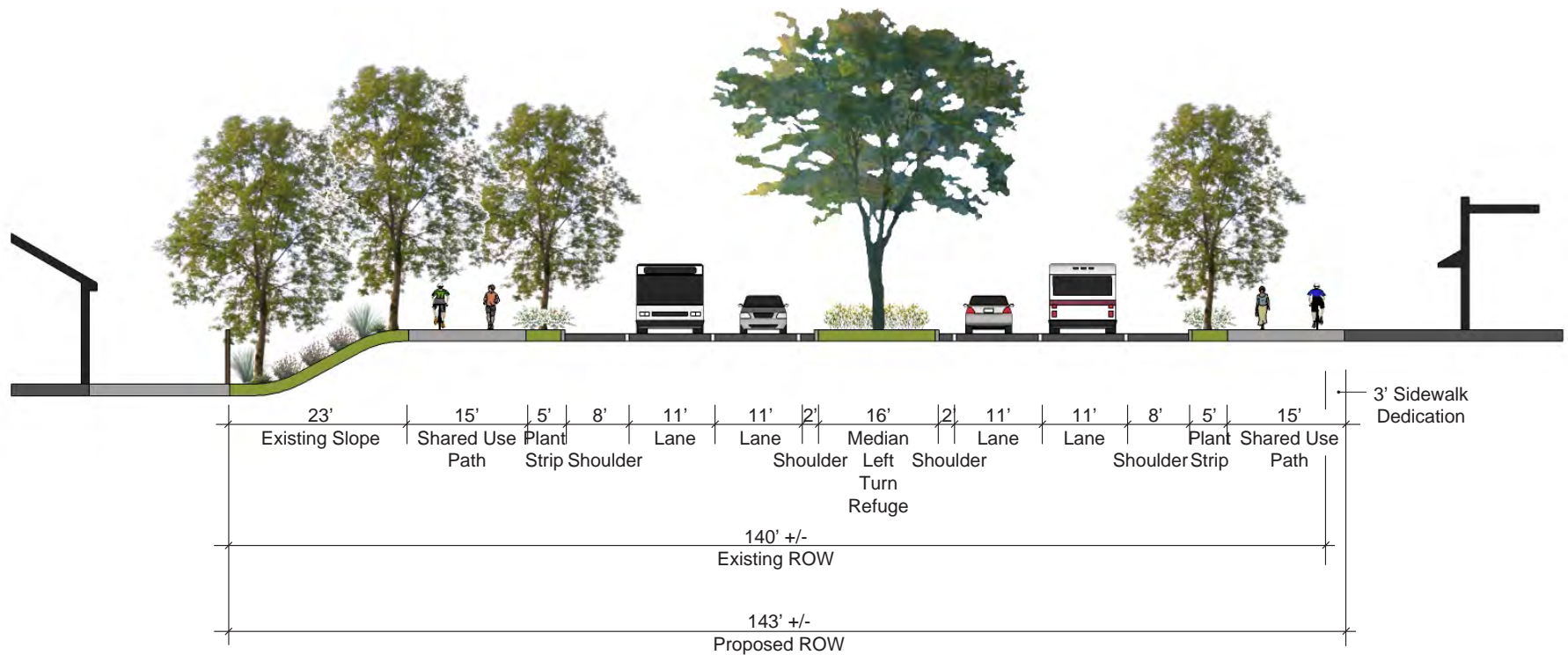


Figure 4-5: Proposed Section - Segment 2 Parkway Concept

West Frontage

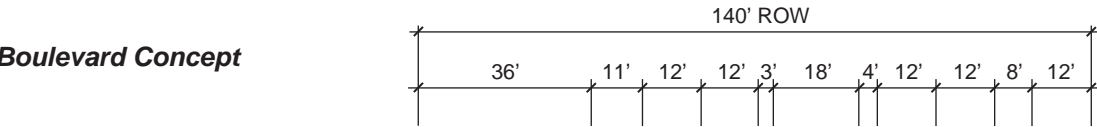
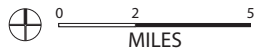
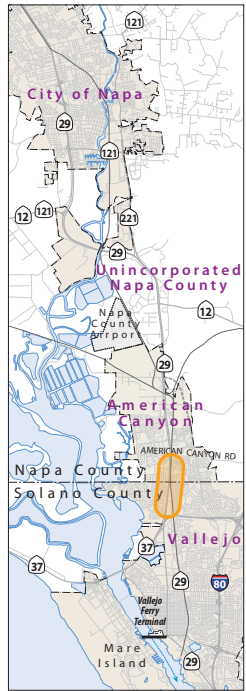
East Frontage



S2 SR 37 to American Canyon Road
Option 1 - Vallejo Parkway Concept

Figure 4-6: Existing and Proposed Conditions - Section 2 Parkway/Boulevard Concept

S2 SR 37 to American Canyon Road
Option 2 - Vallejo SB Parkway/NB Boulevard Concept



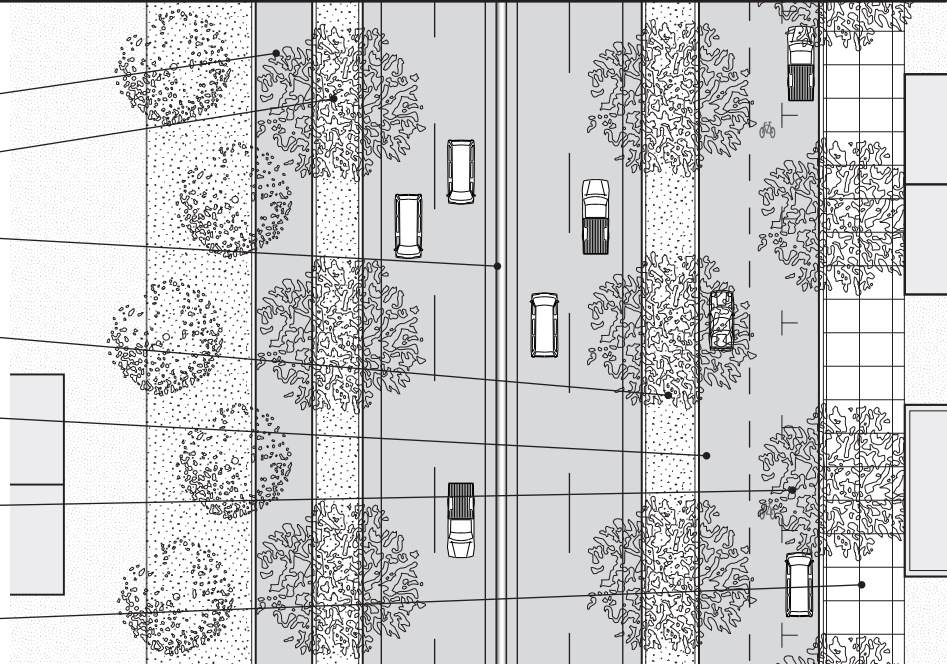
- No sidewalks
- No bicycle lanes
- No trees in median



Existing

Proposed

- Shared use path
- Large trees may require design exception or barrier curb
- Pedestrian refuge at center median may or may not be possible
- Pedestrian refuge within frontage island
- Variation may include contraflow bike lane within frontage road
- On-street parking could be removed to match boulevard design in American Canyon
- Boulevard sidewalk on east frontage



1" = 40'

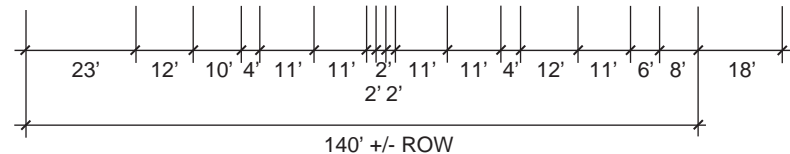
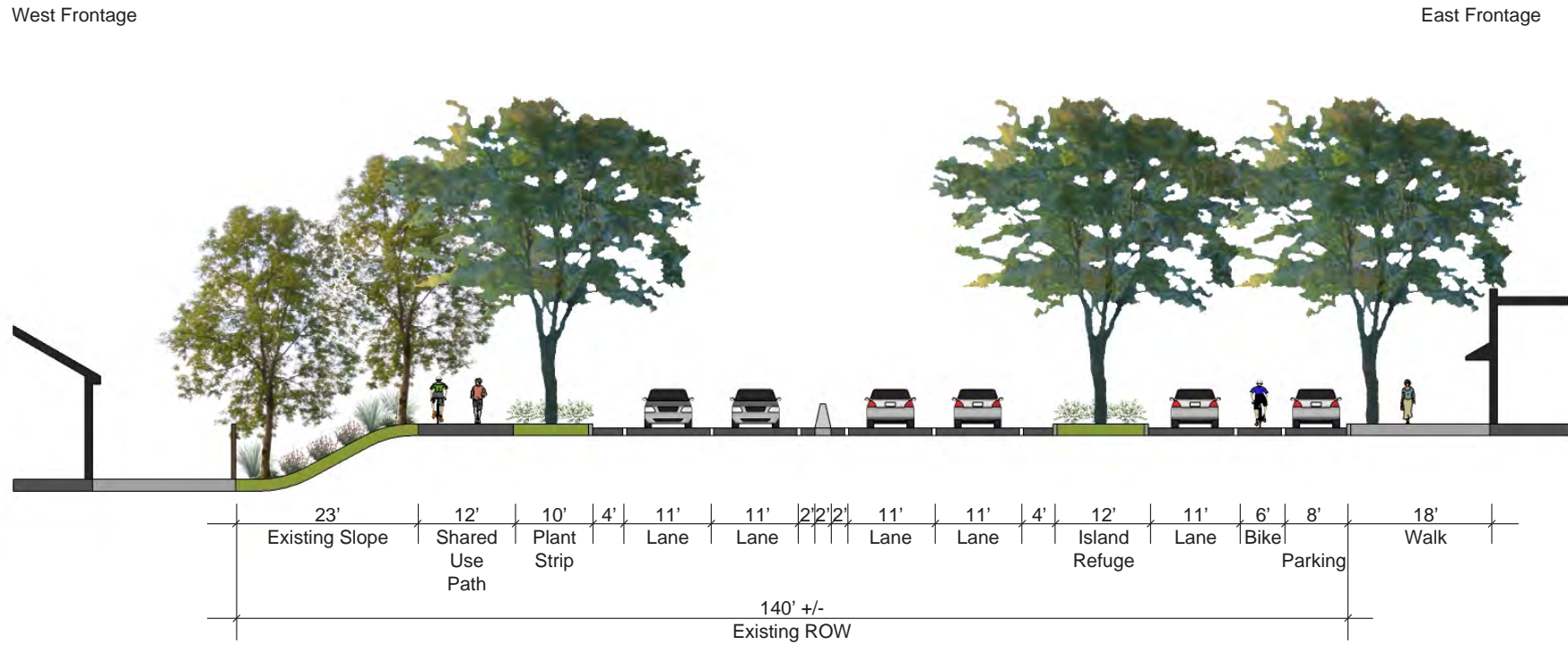


Figure 4-7: Proposed Section - Segment 2 Parkway/Boulevard Concept



S2 SR 37 to American Canyon Road
Option 2 - Vallejo SB Parkway/NB Boulevard Concept

Proposed Improvements

Both Option 1 and Option 2 are carried forward as recommendations, with a preferred recommendation of Option 1 so as to be consistent with recommendations for the next segment north in American Canyon (Segment 3). Improvements for Option 1 and for the southbound direction in Option 2 consist of:

- Landscaping improvements (trees in compliance with Caltrans standards)
- Construction of planting strips
- Construction of Class I shared use paths

For Option 2 in the northbound direction, to create a boulevard, improvements consist of:

- Construction of a northbound local access lane, beginning with a slip lane north of SR 37 and ending at Mini Drive
- Striping of Class II bike lane on local access lane
- Construction of planting strip and sidewalk

No changes to intersection operations at SR 37 are proposed under either scenario.

Projected Operations and Performance Assessment

With improvements in place under either scenario, Intersection 1 is projected to continue to operate at an acceptable level of service (B) during both the AM and PM peak hours (Table 4-1).

Design Considerations and Physical/Infrastructure Constraints

There are three existing culverts crossing the highway along this segment. It is assumed that the culverts can remain in place with potential extensions as necessary to accommodate the roadway widening. The modifications may require construction of 1,600 linear feet (LF) of retaining wall along the west side of the highway, north of Meadows Drive if re-grading the existing slope cannot mitigate the grade differentials.

TABLE 4-1: INTERSECTION 1 PERFORMANCE (SR 29/SR 37)

Scenario	AM LOS	PM LOS
Existing	A	B
Future (4 Lane)	B	B
Future (4 Lane w/NB Boulevard)	B	B

Source: Fehr & Peers, 2013

Segment 3: SR 29 between American Canyon Road and Napa Junction Road (Central American Canyon)

Current Conditions

SR 29 continues as a four-lane highway with an unlandscaped median into central American Canyon. Sidewalks are present in several short stretches on either side of the highway, but discontinuous. Cycling is permitted on the shoulder, but the shoulders are not formally signed or striped as bikeways. Frequent left turn pockets, right turn pockets, and merging areas occur at intersections and driveways to provide access to adjacent businesses and roadways.

This segment of SR 29 currently has between 2,500 and 3,500 vehicles in each direction during the peak hours on weekdays, resulting in a roadway LOS of F. The intersection of SR 29 and American Canyon Road (Intersection 3) performs at LOS E in the AM peak hour and LOS D in the PM peak hour. At SR 29 and Napa Junction Road (Intersection 5), the intersection performs at LOS D in the AM peak hour and LOS B in the PM peak hour. The intersection at Donaldson Way, halfway between American Canyon Road and Napa Junction Road (Intersection 4), performs at LOS C during both peak hours.

The right of way varies from 130 feet to 140 feet to Eucalyptus Drive. Just north of Eucalyptus Drive, the roadway begins widening until it reaches 350 feet at Napa Junction Road.

Alternatives Considered

SR 29 through central American Canyon represents the critical challenge of the Gateway Corridor Study: how to accommodate substantial (and increasing) automobile traffic while improving multimodal mobility and safety, particularly for residents of American Canyon. North of the American Canyon Road intersection, SR 29 will need to widen to six lanes to accommodate future automobile traffic. At the same time, improvements to bicycle and pedestrian travel are of critical importance to local residents who must travel along and across the highway for their daily trips to work, school, and other local destinations.

Two alternatives were analyzed as part of this study: the Boulevard and the Modified Boulevard. Both attempt to balance and address the competing demands of accommodating automobile traffic and improving conditions for other modes of travel. Both involve widening the roadway to six automobile travel lanes and making significant improvements to bicycle and pedestrian facilities, as well as improving landscaping and general roadway aesthetics.

BOULEVARD

The Boulevard would be designed similarly to the northern Vallejo segment described above. In each direction, two through lanes would be provided, aimed at commuter traffic traveling through American Canyon without the intention of stopping at local destinations. A central median landscaped with trees would separate

the through lanes in each direction. No turns would be permitted from these lanes. On the outside of the through lanes, separated by a landscaped median, a slower-speed local access lane would provide access to adjacent businesses and neighborhoods. The local access lane would also have a striped Class II bike lane adjacent to the curb. Separated from the roadway by a planting strip, continuous sidewalks would also be provided. The sidewalk width is also wide enough to accommodate a Class I path. Both right and left turns would be permitted from the local access lane.

Figure 4-8 illustrates the existing conditions and the proposed Boulevard concept. Figure 4-9 shows the section view of the Boulevard concept. Total right of way required is 176 feet.

MODIFIED BOULEVARD

The Modified Boulevard would have six through lanes with regular turning movements permitted (a left turn pocket forming in the median at intersection approaches). A landscaped central median would be planted with trees per Caltrans standards. A Class I shared use path for bicycles and pedestrians would be provided on both sides of the highway, separated from the roadway with landscaped planter strips, also planted with trees. Figure 4-10 depicts the existing conditions and the Modified Boulevard concept, and Figures 4-11 and 4-12 show section and perspective views, respectively, illustrating how the concept would facilitate access and mobility for pedestrians, cyclists, and transit while providing six travel lanes for automobiles. A right

Figure 4-8: Existing and Proposed Conditions - Section 3 Boulevard Concept

S3 American Canyon Road to Napa Junction Road
Option 1 - American Canyon Boulevard Concept

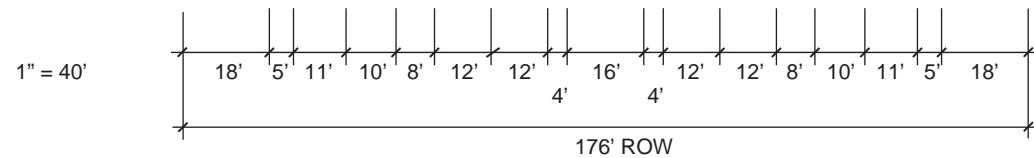
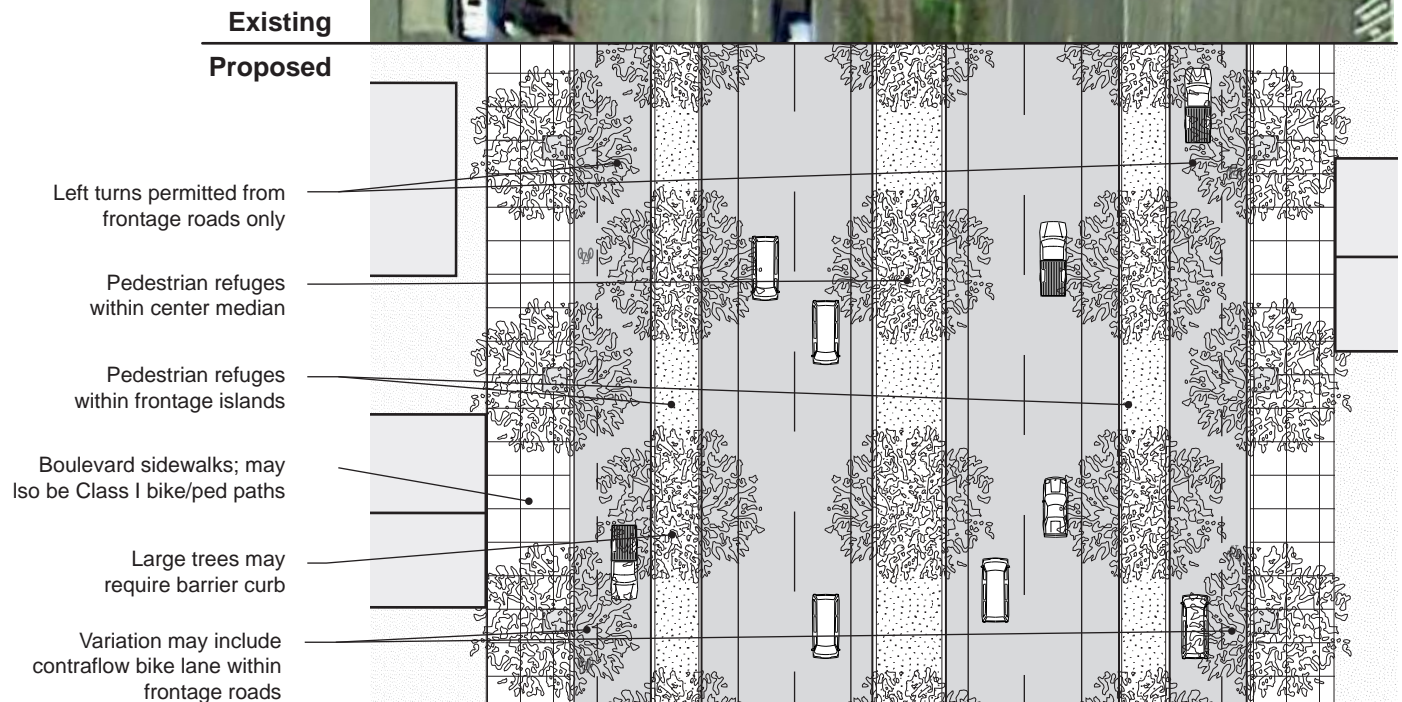
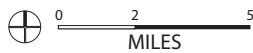
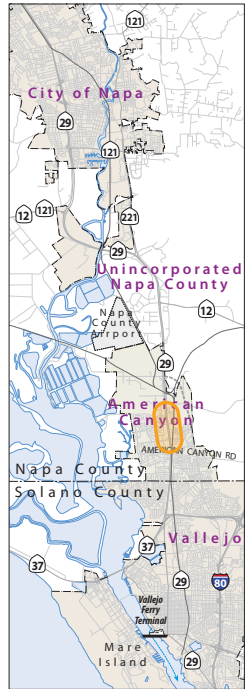
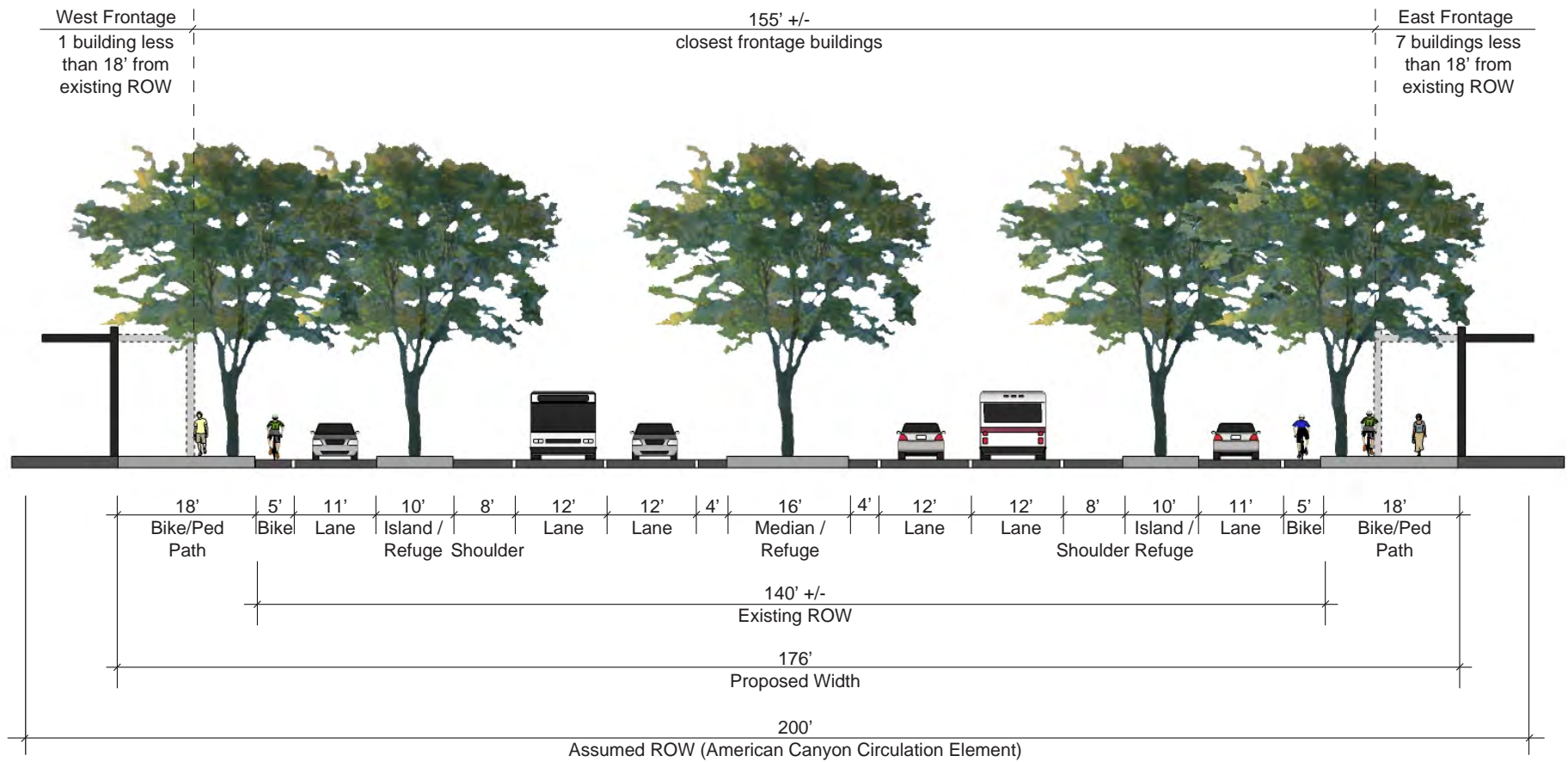


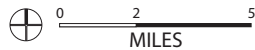
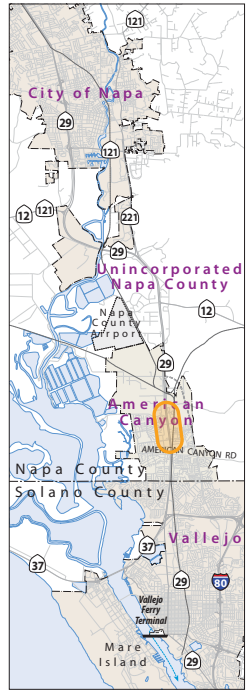
Figure 4-9: Proposed Section - Segment 3 Boulevard Concept



S3 American Canyon Road to Napa Junction Road
Option 1 - American Canyon Boulevard Concept

Figure 4-10: Existing and Proposed Conditions - Section 3 Modified Boulevard Concept

S3 American Canyon Road to Napa Junction Road
Option 2 - American Canyon Modified Boulevard Concept



- Discontinuous sidewalks
- Shoulder permits cycling, but is not signed or striped
- No trees in median



Existing
Proposed

- Separated bike/ped path; bikeways may be striped separately
- Large trees on sidewalk and median would require approval of Caltrans Design Coordinator and concurrence of Caltrans Headquarters Traffic Liaison



1" = 40'

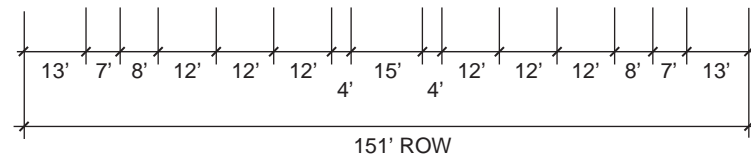
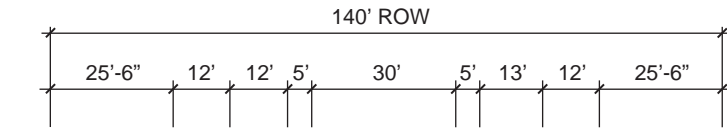
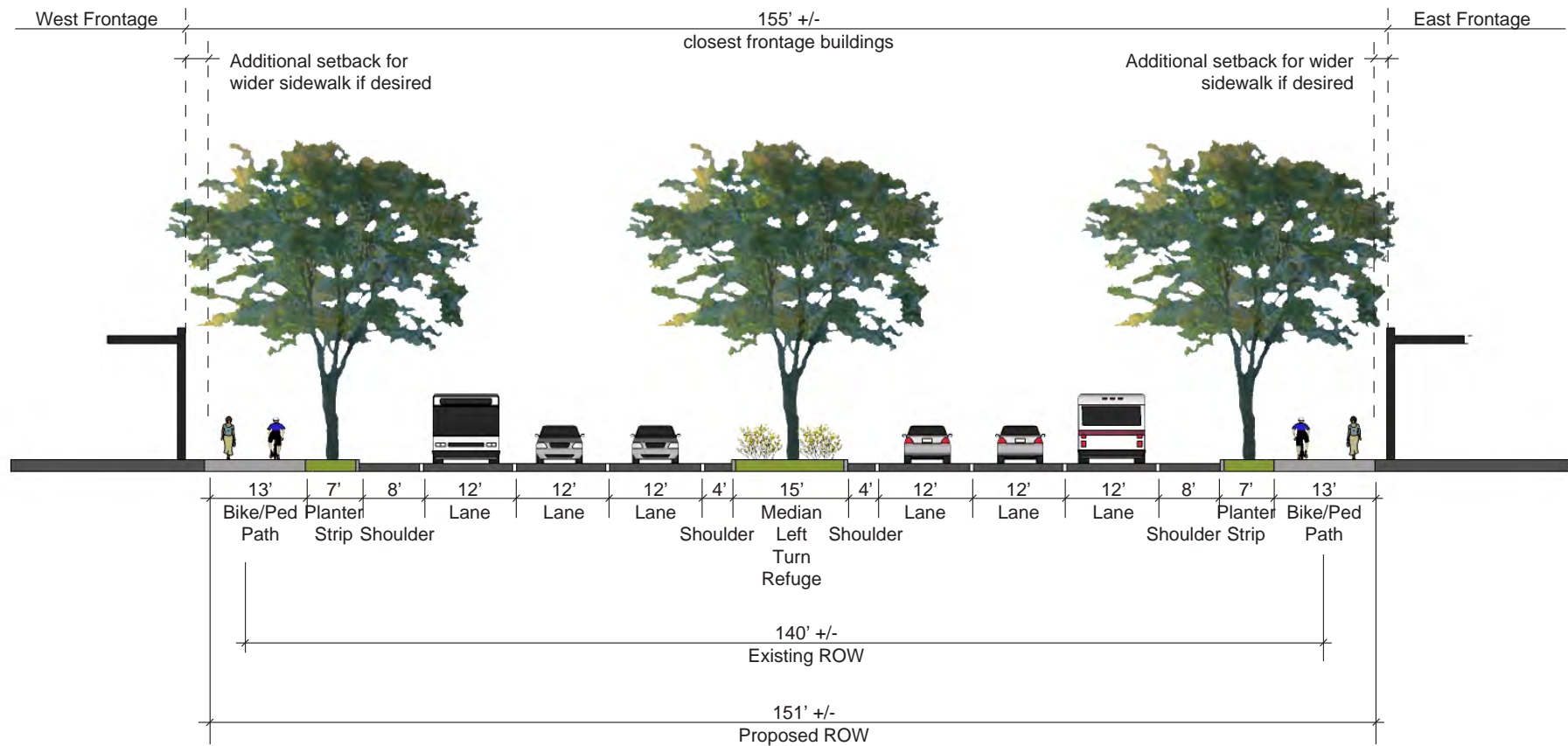
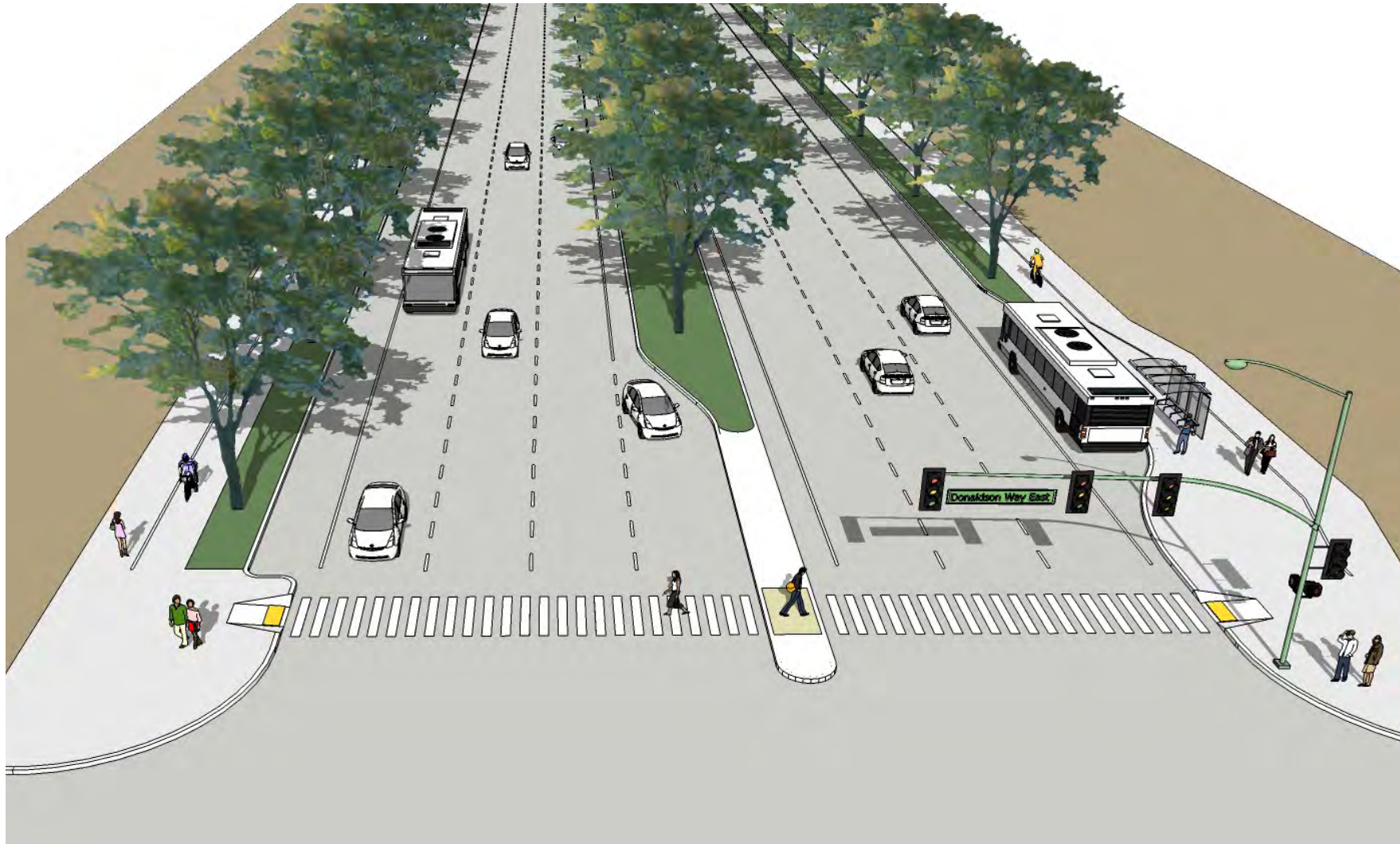


Figure 4-11: Proposed Section - Segment 3 Modified Boulevard Concept



S3 American Canyon Road to Napa Junction Road
Option 2 - American Canyon Modified Boulevard Concept

Figure 4-12: Perspective - Segment 3 Modified Boulevard Concept



S3 American Canyon Road to Napa Junction Road
Option 2 - American Canyon Modified Boulevard Concept

of way of 151 feet would generally be required along the roadway. A wider right-of-way would be necessary at intersections to facilitate left and right turning movements.

MICROSIMULATION ANALYSIS

While preliminary modeling of the Boulevard concept showed that it would improve traffic conditions to acceptable levels of service on the roadway between American Canyon Boulevard and Napa Junction Road and provide a desirable environment for pedestrians and cyclists, there remained concerns among the participating jurisdictions about certain aspects of the design: transitions between through and local access lanes, driver education, impacts on local businesses, impacts of turning movements on adjacent neighborhoods, and impacts to transit operations.

Designed to model regional travel, the N-STDm is not a fine-grained enough tool to accurately illustrate operations at the level of detail required to address these questions. To better understand how all modes of travel would perform under the two configurations, a microsimulation using Vissim traffic analysis software was performed, which showed detailed performance and traffic interactions at six intersections in American Canyon:

1. SR 29 / American Canyon Road
2. SR 29 / Donaldson Way
3. SR 29 / Poco Way / South Napa Junction Road

4. SR 29 / Rio Del Mar
5. SR 29 / Eucalyptus Drive
6. SR 29 / Napa Junction Road

The design options were analyzed using the Vissim (version 6) traffic microsimulation software. The analysis uses models of vehicle performance and driver behavior to model the interaction of agents (cars, bicycles, pedestrians, etc.), roadways, and traffic control. The software outputs various performance measures including throughput (volume served), delay, speed, and travel time. The software uses random seed values to generate vehicle entry time and vehicle characteristics. The results are an average of ten runs with different random seeds. Using the intersection delay results, the intersection LOS was assigned.

RESULTS

The Modified Boulevard option has three through lanes in each direction at the study

intersections. With the higher capacity, this option is able to serve nearly all of the cumulative year PM peak hour traffic demand during the peak hour. This option can also accommodate potential Bus Rapid Corridor and/or HOV operations in the future. This would not be possible with the Boulevard option.

The Boulevard option, which has two through lanes, would only serve about three-fourths of the peak hour demand volume during the peak hour. As a result, the total delay measured in the analysis area for the Boulevard option is more than double the delay for the Modified Boulevard option. Table 4-2 summarizes the network performance of the two design options.

The network-wide average speed and number of stops show similar results: the Boulevard option has less than half the average speed and more than twice the number of stops as the Modified Boulevard option. Travel time between Kimberly Drive (south of American Canyon Road)

TABLE 4-2: AMERICAN CANYON NETWORK PERFORMANCE

Performance Measure	Modified Boulevard	Boulevard
Percent Demand Volume Served	99%	76%
Total Delay ¹ (All Traffic)	386 hours	896 hours
Total Delay ¹ (Non-motorized)	8 hours	10 hours
Average Speed for Motorized Traffic	22.8 mph	10.9 mph
Number of Stops for Motorized Traffic	19,711 stops	42,220 stops
Travel Time and Speed (Northbound)	5.8 minutes, 26.0 mph	7.3 minutes, 20.8 mph
Travel Time and Speed (Southbound)	6.3 minutes, 24.2 mph	11.2 minutes, 13.5 mph

1. Delay to vehicles queued outside of the network (for example, north of South Kelly Road) is not measured.

2. Travel time and speed are measured for vehicles traveling from Kimberly Drive to Green Island Road.

Source: Fehr & Peers, 2014

and Green Island Road (north of Napa Junction Road) is 1.5 minutes faster in the northbound direction and nearly five minutes faster in the southbound direction for the Modified Boulevard option.

Table 4-3 shows the intersection level of service (LOS) and average delay for the signalized intersections. The study intersections would operate at one LOS grade better under the Modified Boulevard compared to the Boulevard option. The fewer through lanes and higher signal cycle length in the Boulevard option provide lower corridor capacity. The lower capacity causes the higher average delays.

In the Boulevard option, the southbound queue at Napa Junction Road extends outside the model network boundary at South Kelley Road, which is about 5,000 feet north. For the Modified Boulevard option, the average maximum queue length for the southbound approach

is 3,275 feet, which is less than the distance to Green Island Road (3,700 feet).

Proposed Improvements

This study recommends the Modified Boulevard design described in the alternatives section above. Improvements needed to implement the Modified Boulevard concept consist of:

- Right of way acquisition
- Construction of a third automobile travel lane in each direction
- Construction of Class I shared use paths
- Landscaping improvements to median (trees in compliance with Caltrans standards)
- Improved pedestrian crossings (refuges at medians, striping, and potentially different pavement or painting)
- Construction of planting strips

Safe and enhanced pedestrian crossings—especially, for example, near American Can-

yon Road, where schools are located east of the SR 29, and residential uses to the west—must also be provided. The City of American Canyon’s recently adopted Circulation Element proposes three pedestrian overpasses across SR 29, and participants in the outreach process for this Plan would like to see at least one overpass as well, as contemplated in the city’s Circulation Element. Because of the required height clearances for vehicles, any such overpass(es) will result in pedestrians negotiating considerably longer distances and expending additional energy going up and down, which may diminish use of the overpasses, as well as create safety issues if pedestrians continue to cross SR 29 at grade. Thus, the desirability (and cost) of the overpasses should be weighed against improved pedestrian crosses at grade, with sidewalk bulbouts and refuges at medians. This evaluation is beyond the scope of this Improvement Plan, and should be taken as part of the next stages of finalization of improvements, and in American Canyon’s forthcoming Specific Plan for the corridor.

Projected Operations/Performance Assessment

The transportation analysis of cumulative year PM peak hour conditions shows that the Modified Boulevard option out-performs the Boulevard option with regard to motorized vehicle operations. The Modified Boulevard option has a higher throughput, lower total delay, and lower travel times on SR 29.

TABLE 4-3: AMERICAN CANYON INTERSECTIONS PERFORMANCE				
Intersection	Modified Boulevard		Boulevard	
	LOS	Delay	LOS	Delay
American Canyon Road	E	61	F	181
Donaldson Way	C	28	D	45
Poco Way / South Napa Junction Road	C	29	D	39
Eucalyptus Drive	E	58	F	95
Napa Junction Road	E	66	F	201
Note: Average Delay is reported in seconds per vehicle.				

Source: Fehr & Peers, 2014

Although the Boulevard option would have higher non-motorized delay due to the longer cycle lengths, the level of pedestrian and bicycling comfort would likely be higher. The Boulevard option's cross section has multiple medians so that pedestrians crossing SR 29 would have less exposure to vehicle traffic. The north-south pedestrian phases at Eucalyptus Drive, Poco Way/South Napa Junction Road, and Donaldson Way would not have conflicting traffic since the phases are concurrent with the SR 29 mainline (for the Modified Boulevard option, northbound and southbound right-turning vehicles must yield to pedestrians and bicycles). Also, the frontage roads provide a barrier to the higher speed traffic on mainline lanes, which would improve comfort for pedestrians and bicyclists traveling along SR 29.

Vehicle performance for the Boulevard option could be improved with additional project features. For example, providing three through lanes for the mainline would provide additional capacity. Alternately, grade separation of the mainline lanes at the local street intersections would also increase through capacity for SR 29. These additional features may require additional right-of-way and would have higher construction cost (particularly for the grade separations).

Design Considerations and Physical/Infrastructure Constraints

The roadway median along this segment of the Study Corridor widens, with the ROW maintaining a width of 140 feet. The available records for this segment originate in 1943, although they

have updates as recently as 1973. Given the age of the record documents, items of potential concern may not still be relevant.

The record documents indicate that there were Joint Use Access (JUA) easements in the past with both railroad companies and PG&E. While there are no longer rail lines in use here, it is not known whether the tracks were removed or buried and whether the former JUA easements and adjoining ROW are still in place or have since been quitclaimed. There are overhead utility lines at two crossings just north of American Canyon Road. Additionally, a six-inch high-pressure gas line identified on the plans could still potentially be in use by PG&E.

There is one existing culvert crossing within Segment 3. It is assumed that the culvert can remain in place with potential extension improvements as necessary to accommodate the roadway improvements for the Modified Boulevard design. It is not anticipated that retaining walls will be required along this segment in order to implement the Modified Boulevard.

Segment 4: SR 29 from Napa Junction Road to Jameson Canyon Road/Airport Boulevard (Northern American Canyon and Napa County)

Current Conditions

North of Napa Junction Road, through the northern portion of the City of American Canyon and on into unincorporated Napa County, SR 29 is a four-lane highway with a median

(landscaped with grass only). There are no pedestrian facilities. Wide shoulders permit cycling, but these are not formally signed or striped bike lanes.

This segment of SR 29 currently has daily vehicle volumes between 3,400 and 3,700 during the peak hours, resulting in a roadway LOS of E in the northbound direction and E/F southbound. The intersection of SR 29 and South Kelly Road (Intersection 7) performs at LOS C in the AM peak hour and LOS B in the PM peak hour. At the intersection of SR 29 and Jameson Canyon (SR 12)/Airport Boulevard, the intersection performs at LOS D in both peak hours.

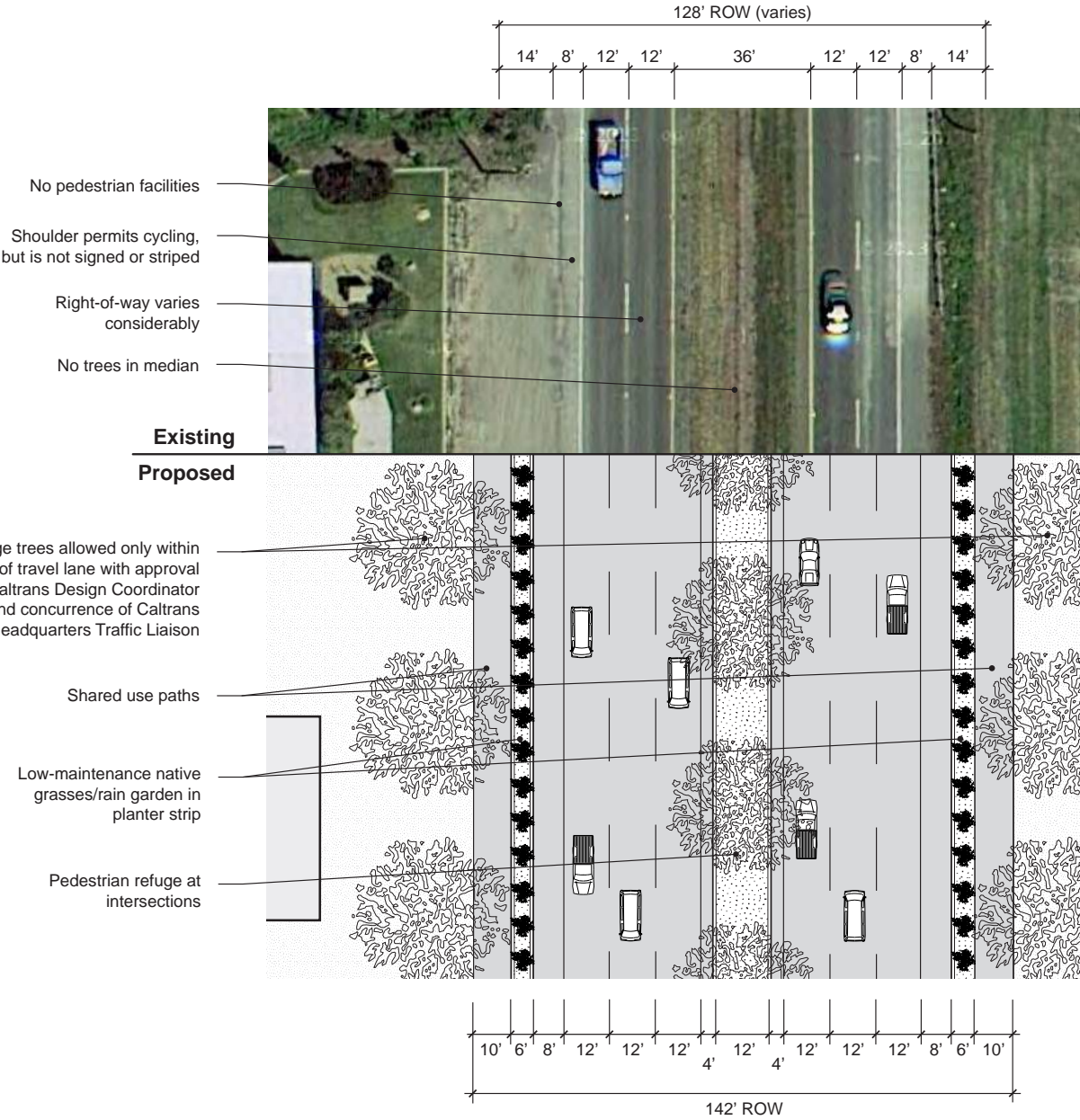
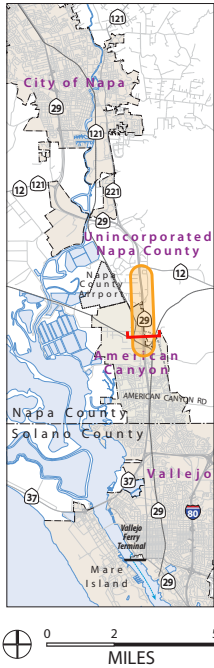
Immediately to the north of Napa Junction Road, the SR 29 right of way reduces to 215 feet, but then begins widening again to about 325 feet approaching the overpass of the railroad tracks. North of Green Island Road, the ROW becomes a consistent 128' until about 60 feet south of the intersection with South Kelly Road. South of South Kelly Road, the ROW becomes 167 feet wide consistently until SR 12.

Alternatives Considered

Community members and participating jurisdictions expressed general agreement for this section of the roadway based on the Vision Plan, emphasizing improving traffic, accommodating bicycles and pedestrians where it was safe and logical to do so, and making aesthetic improvements. No major alternatives for the roadway

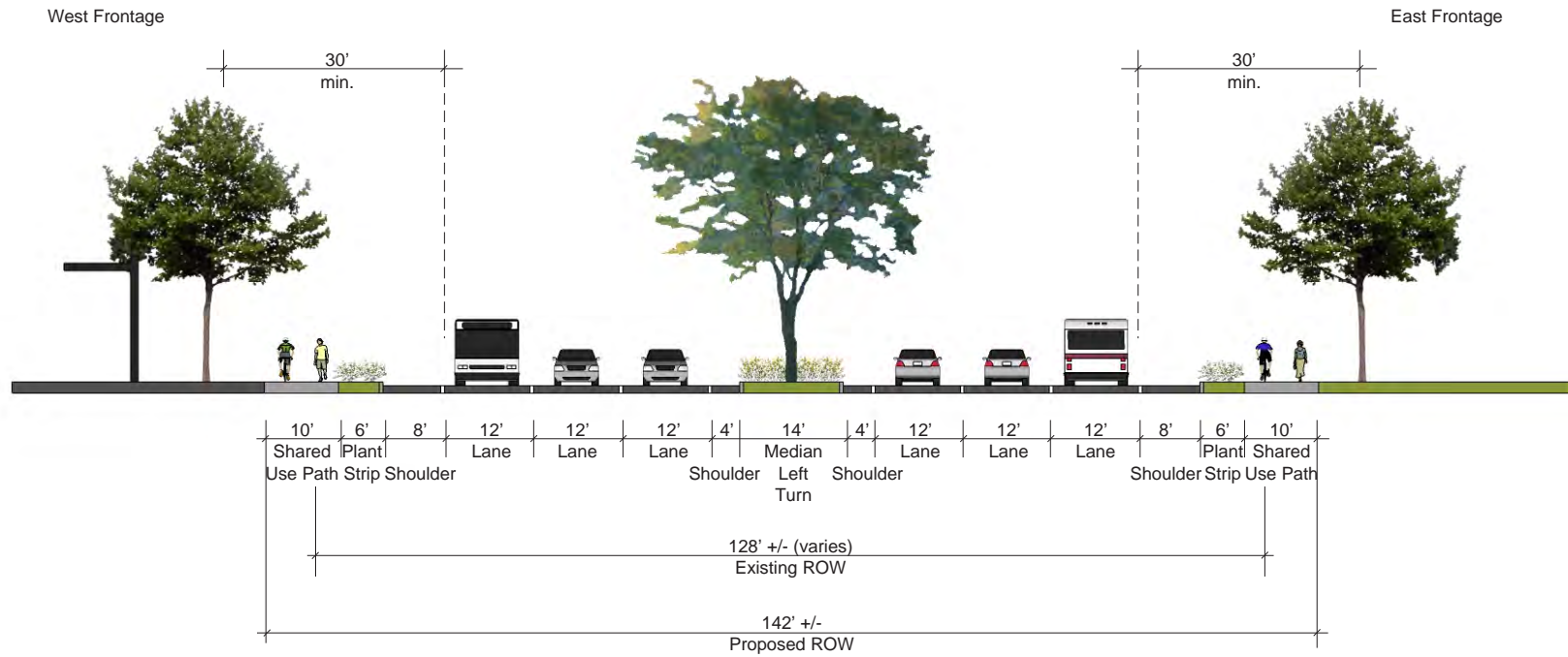
Figure 4-13: Existing and Proposed Conditions - Segment 4 Parkway Concept (Napa Junction Road to South Kelly Road)

S4-a Napa Junction Road to South Kelly Road



1" = 40'

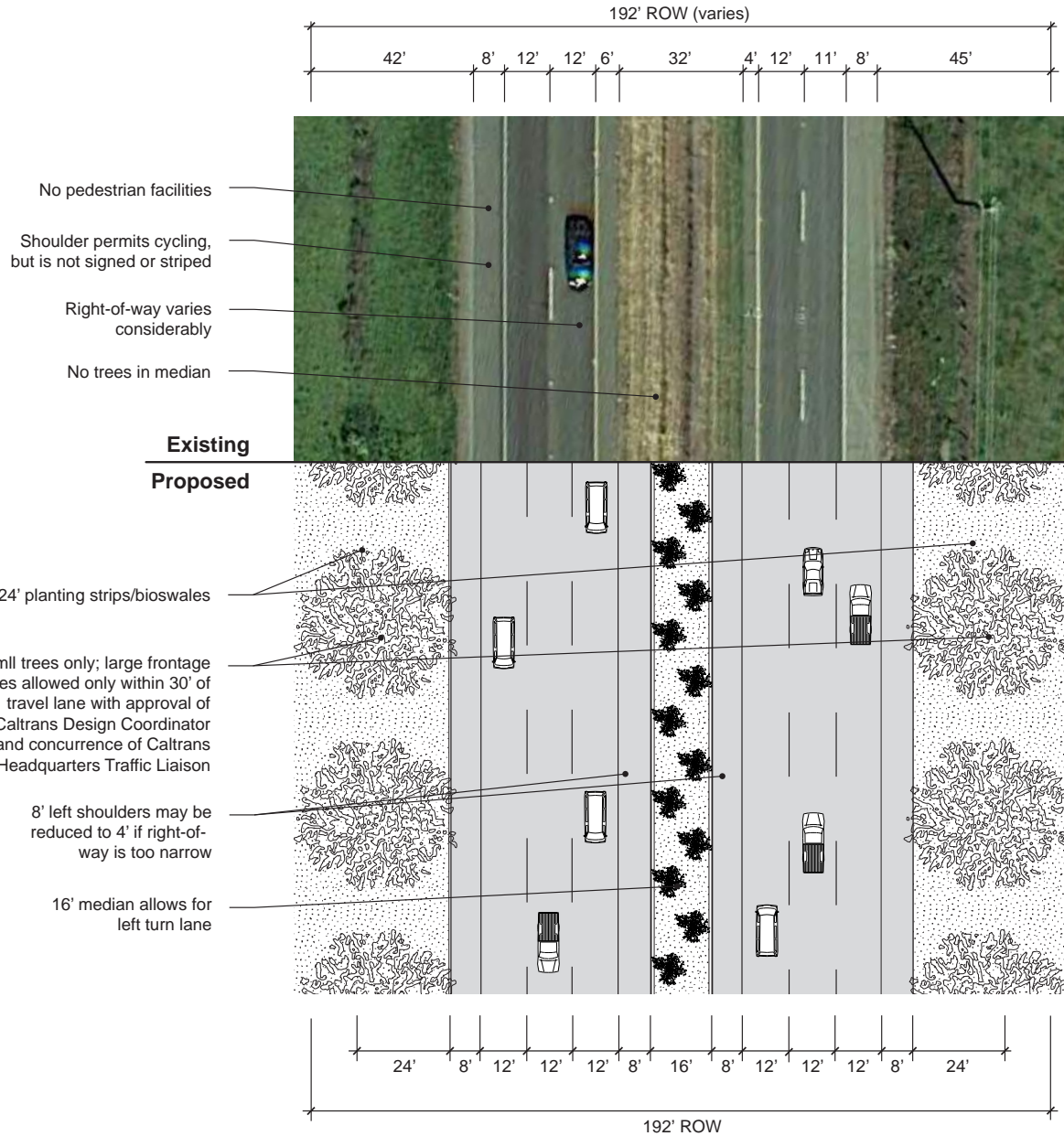
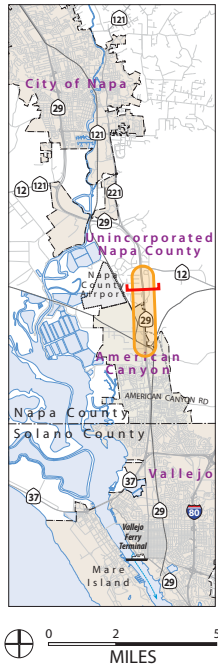
Figure 4-14: Proposed Section - Segment 4 Parkway Concept (Napa Junction Road to South Kelly Road)



S4-a Napa Junction Road to South Kelly Road

Figure 4-15: Existing and Proposed Conditions - Segment 4 Rural Highway Concept (South Kelly Road to Jameson Canyon Road)

S4-b South Kelly Road to SR 12/Jameson Canyon Road



1" = 40'

Figure 4-16: Proposed Segment - Segment 4 Rural Highway Concept (South Kelly Road to Jameson Canyon Road)

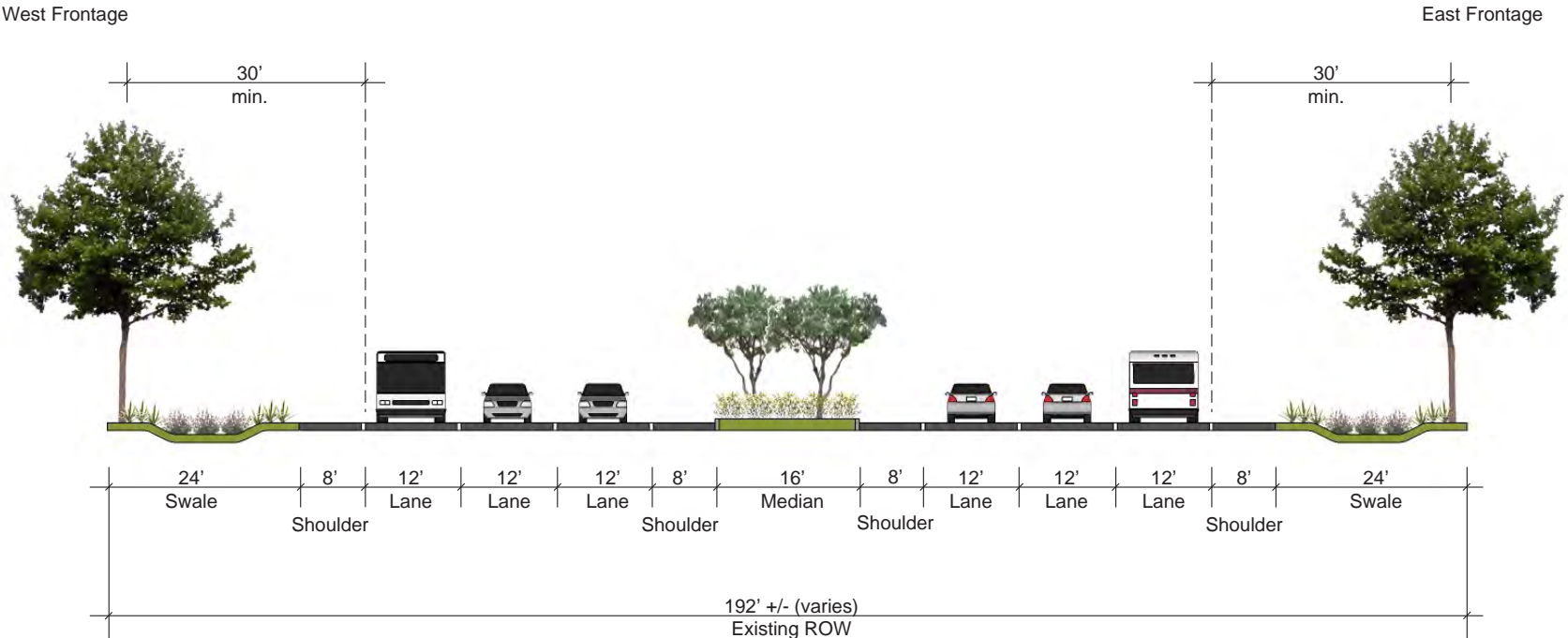
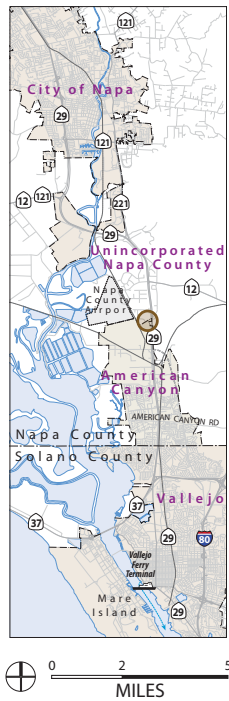


Figure 4-17: Bicycle Connections at South Kelly Road

17 Bicycle Access North of American Canyon



- Vine Trail
- Cyclists permitted but not recommended
- Preferred cyclist route

1" = 400'

segment were modeled, beyond the future No Project (maintaining four lanes) and future six lanes.

Different alternatives were considered and modeled for Intersection 8 (SR 29 and Jameson Canyon/SR 12); these are discussed in more detail in the next section.

Proposed Improvements

In this segment, SR 29 should be widened to six lanes to accommodate future traffic, while also making improvements to bike and pedestrian travel. The proposed configuration is six through lanes, with eight-foot outside shoulders and four-foot inside shoulders adjacent to the median. The central median and planting strips should be landscaped with trees. Refer to Figures 4-13 and 4-14 for plan and section diagram of this segment. While the roadway cross-section may need to narrow in places due to constraints such as bridges; pedestrian and bicycle facilities should be preserved.

From South Kelly Road to Jameson Canyon Road, SR 29 remains at six through lanes, with eight-foot inside and outside shoulders wherever feasible. See Figures 4-15 and 4-16 for illustrations of this segment.

A 12-foot Class I shared use path should be provided on each side of the roadway from Napa Junction Road to South Kelly Road. At this point, primary bicycle access is provided via other adjacent facilities. To the east, bicycle access is provided via South Kelly Road, which

bends north and connects to Jameson Canyon Road. To the west and north along the remainder of the Study Corridor, bicycle access is provided via the connection to Devlin Road, which is the future alignment of the Vine Trail. Figure 4-17 illustrates the bicycle network at this transition zone. If an underpass can be constructed at South Kelly Road, the Vine Trail may shift its alignment to cross SR 29 here instead of via the Paoli Loop. While the Class I shared use path is discontinued north of South Kelly Road, bicycle use is still permitted on the shoulder.

Projected Operations/Performance Assessment

The six-lane roadway configuration will improve level of service at the intersection at South Kelly Road (Intersection 7) to acceptable conditions (Table 4-4). Future operations of the Jameson Canyon intersection are discussed in the next section.

Design Considerations and Physical/Infrastructure Constraints

Implementing the proposed roadway improvements for the southern portion of this segment may be constrained by the Southern Pacific

Railroad highway overpass (the Lombard Crossing). Each direction of the overpass is approximately 40 feet wide and could accommodate the three lanes of traffic with reduced shoulders. Significant modifications to the existing roadway overpass or construction of a separate pedestrian/bicycle overpass would be necessary in order to link the shared bike and pedestrian improvements proposed to the north and south of the railroad. Both the north and south approaches to the overpass would require a minimum 20 feet widening to accommodate the new shared paths. It is not clear at this time whether re-grading of the existing highway embankment slopes will be sufficient to accommodate the extra width or if retaining structures would also be required. For this reason, alternatives to providing Class I paths on both sides of the highway in this portion of the segment should be considered, as long as bicycle access along the roadway is maintained in some form.

At the northern end of this segment, the PG&E JUA (Joint Utility Easement) documented in the records may have active utilities`.

Fagan Creek crosses under SR 29 less than one mile south of SR 12. In addition, a large existing storm culvert crosses the roadway just north of Fagan Creek. With the wider medians along

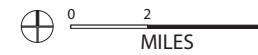
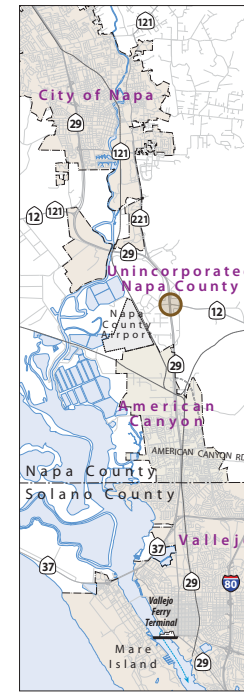
TABLE 4-4: INTERSECTION 7 PERFORMANCE (SR 29/SOUTH KELLY ROAD)		
Scenario	AM LOS	PM LOS
Existing	C	B
Future No Project (4 Lanes)	F	F
Future (6 Lanes)	C	C

Source: Fehr & Peers, 2013

Figure 4-18: Tight Diamond Interchange Design - Intersection 8



Figure 4-19: Single Point Urban Interchange (SPUI) Design - Intersection 8



this entire stretch of highway, there appear to be various sized drainage culverts along and across the roadway. It is assumed that no major modification will be required for these, other than possible extension of the existing lines.

Intersection 8: Jameson Canyon Road/Airport Boulevard

Current Conditions

The intersection of SR 29 with Jameson Canyon Road/SR 12 (to the east) and Airport Boulevard (to the west) is currently an at-grade, signalized intersection (Intersection 8). Free/unsignalized right turns are allowed from every approach. Southbound on SR 29 and eastbound on Airport Boulevard, there are two left turn lanes. Other approaches have one left turn lane. The intersection currently performs at LOS D in both peak hours, with average delays of 44 to 46 seconds.

At SR 12, there is an octagonal-shaped right-of-way to encompass the intersection. The octagon is about 600 feet long aligned with SR 29 and about 650 feet at its widest where SR 12 crosses.

Alternatives Considered

The future design for the Jameson Canyon intersection is characterized in Caltrans' current plans as a standard "tight diamond" interchange, with free-flowing northbound and southbound movements on SR 29, a westbound on-ramp to northbound SR 29, an eastbound on-ramp to southbound SR 29, and two signals

where the off-ramps intersect Jameson Canyon Road. While this configuration would improve to LOS C in the AM peak hour, LOS in the PM peak hour is projected to decline to LOS E given the future volumes of traffic predicted.

Stakeholders in this study desired to test an alternative interchange design known as a Single-Point Urban Interchange (SPUI), which would eliminate one of two signals required by the tight diamond interchange, potentially reducing delay and improving LOS. Generally speaking, there are several broad advantages and disadvantages of a SPUI over other interchange types should be taken into consideration. Advantages include a single controller (traffic signal), which makes for simpler phasing and potentially easier synchronization with other signals; and increased capacity. Disadvantages include a wider crossing distance and consequently longer signal phases; potentially higher construction costs due to a larger bridge deck; and potentially more complex pedestrian crossings on the cross street.

TABLE 4-5: INTERSECTION 8 FUTURE PEAK HOUR LOS AND DELAY (SR 29/JAMESON CANYON)

Peak Hour	Diamond Weighted Average Delay	SPUI Average Delay
AM	C, 25 seconds	D, 46 seconds
PM	E, 62 seconds	F, 94 seconds

Source: Fehr & Peers, 2013

Figures 4-18 and 4-19 illustrate conceptual designs of the two options tested.

An additional option discussed amongst the committee members is a "teardrop roundabout", which will require additional modeling and study. Preliminary order-of-magnitude cost estimates for this design are included in Appendix D.

ANALYSIS

In order to make an "apples-to-apples" comparison between the diamond interchange and the Single Point Urban Interchange (SPUI), Fehr & Peers took the weighted average delay of the two diamond intersections to develop the average delay of both intersections together (to compare the average to the one intersection of the SPUI). Note that this is a rough estimate of the average delay, as it does not take into account the weighted delay by movement.

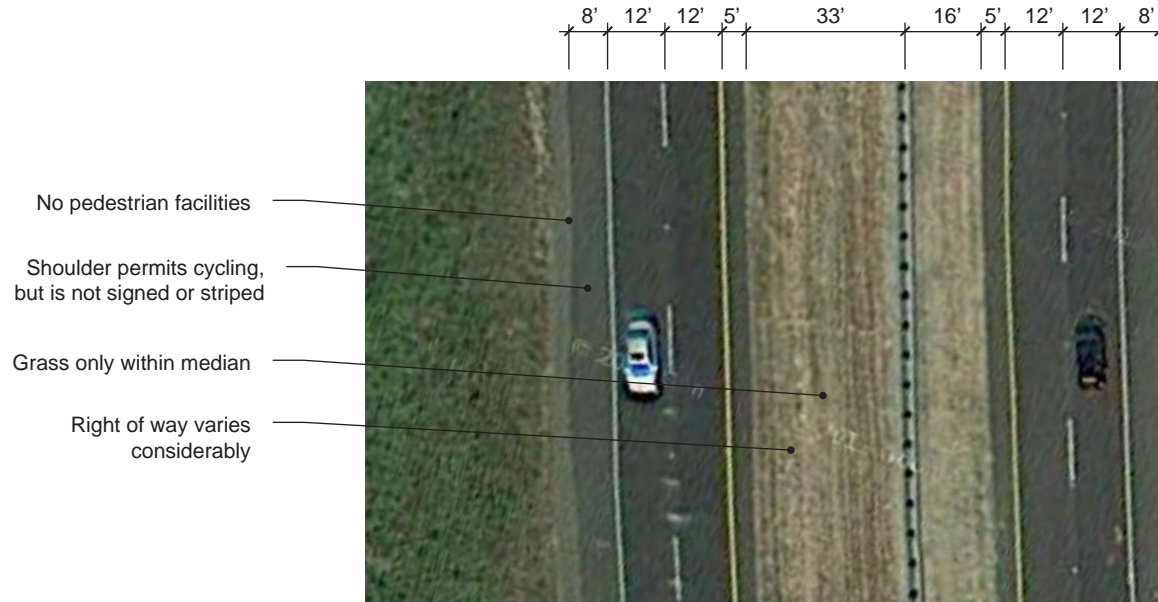
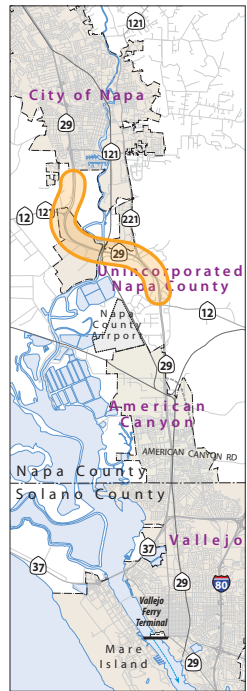
RESULTS

The SPUI performs similar to the diamond interchange, even though it is configured with longer yellow and all-red signal phase times (due to longer intersection crossing distances) (Table 4-5).

For the AM case, performance is slightly worse overall likely due to the distribution of trips. The southbound left movement is the heaviest. This movement is counted twice (once for each intersection): a heavily delayed southbound left on the western intersection, and an eastbound through movement on the eastern intersection

Figure 4-20: Existing Conditions - Segment 5

S5 Highway 12/Jameson Canyon to Urbanized City of Napa



Existing Conditions

The existing four lanes will remain sufficient to handle future demand. Improvements to highway will be limited to landscaping and signage in the median and along frontages, with major improvements at intersections only.

1" = 40'

with very little delay (due to light volume for the conflicting movement).

For the PM case, SPUI performance continues to be worse than the tight diamond interchange. Southbound left is still the heaviest movement, but volumes that conflict with the southbound left are also heavier (compared to the AM). This limits the green time for southbound lefts for the SPUI. While this green time limitation also occurs at the western intersection of the diamond interchange, those vehicles continue through at the eastern intersection with little delay, reducing the average delay.

Proposed Improvements

Based on the results of the alternatives testing, and weighing advantages and disadvantages, the proposed improvement for the Jameson Canyon intersection is the tight diamond interchange. Northbound and southbound SR 29 would experience free-flow. The westbound on-ramp to northbound SR 29 and the eastbound on-ramp to southbound SR 29 would also experience free-flow. Airport Boulevard/Jameson Canyon would bridge over the highway, with signals at

off-ramps and at Jameson Canyon Road/Airport Boulevard.

This interchange will also serve as the transition point for SR 29 from six lanes (south of the intersection) to four lanes (north of the intersection). Northbound, this is accomplished by having the third through lane becoming a trap exit lane to Jameson Canyon Road. Southbound, this is accomplished by having the entrance lane from Airport Boulevard remain as a travel lane south of the interchange.

Projected Operations/Performance Assessment

Table 4-6 shows projected operations for the interchange in the tight diamond configuration. LOS is only shown for the southbound/northbound ramp intersections only; in other words, movement in the east/west direction is not averaged in. Southbound and northbound ramps would perform at LOS C in the AM peak hour, and LOS F (southbound) and A (northbound) in the PM peak hour

Segment 5: SR 29 North of Jameson Canyon Road (Napa County)

Current Conditions

North of Intersection 8, SR 29 currently continues as a four-lane rural highway with a median, landscaped with grass only. There are no pedestrian facilities. Wide shoulders permit cycling, but these are not formally demarcated for bicycle use. Figure 4-20 shows existing conditions.

The segment of SR 29 between Jameson Canyon Road and SR 221 currently sees the highest vehicle volumes of the entire corridor, from 4,200 northbound to nearly 5,000 southbound during the AM peak hour and over 5,000 northbound during the PM peak hour. These volumes translate to a roadway level of service of F in both directions. Between SR 221 and SR 121 (the Carneros intersection), volumes decrease as traffic splits between SR 29 and SR 221 towards Downtown Napa. Roadway level of service for this segment varies from D to F.

North of Intersection 8, the right of way is 192 feet then varies around the curve to the west prior to the junction at SR 221 from about 200 to 300 feet or more. Continuing past SR 221, the right of way increases significantly to 700 feet or more in parts; vehicle travel lanes and shoulders account for approximately 84 feet of this width. The median varies from zero to about 50 feet. Most of this right of way width encompasses ground slopes as SR 29 rises to pass over Napa Valley Corporate Drive and then the Napa River.

At the river crossing, there is another railroad crossing of Union Pacific Railroad tracks and the right of way narrows just at the tracks to 95 feet, which is assumed to encompass the single span of four lanes crossing the tracks and river. The road continues along an elevated span west of the Napa River in a 265-foot right of way path, crossing over Stanley Lane before widening again on-grade to about 550 feet. The right of way width varies around the curve back to the north, but is never less than 330 feet, and

TABLE 4-6: INTERSECTION 8 PERFORMANCE AS TIGHT DIAMOND (SR 29/JAMESON CANYON)

Scenario	AM LOS	PM LOS
Existing	E	D
Future (Full Interchange)	C/C*	F/A*
*LOS shown for SB/NB ramp intersections only		

Source: Fehr & Peers, 2013

widens significantly, 600 to 700 feet or more, at the junction with Highways 12 and 121. Approaching the urbanized limits of the City of Napa, the right of way begins to narrow down to 220 feet at the first residences south of Napa.

Currently cyclists are prohibited from accessing the SR 29 bridge over the Napa River. Future solutions that will permit extending a Class II bike lane over the bridge to provide access for skilled cyclists may involve raising the railings on the bridge.

Alternatives Considered

Similar to the segment between Napa Junction Road and Jameson Canyon Road, there was general agreement amongst the community and stakeholders about the desired future character of the roadway through this section of the corridor. SR 29 should remain a rural highway, with some enhanced landscaping, signage, and bike facilities where appropriate. Assessment of alternatives in this segment focused around the intersections—Intersection 9, SR 221 (Soscol) and Intersection 10, SR 121 (Carneros)—which are each discussed separately in subsequent sections.

Proposed Improvements

North of the Jameson Canyon intersection, four lanes remain sufficient to support travel demand in the future, provided that improvements to the major intersections are also implemented, including adequate transition lanes. Therefore, apart from the intersections, improvements to

the corridor are limited to improving landscaping and signage in median and along the frontage. Bicycles are permitted on the roadway until it becomes a limited access freeway (north of Carneros), but it is anticipated that the Vine Trail—which will run parallel to the corridor, but not immediately adjacent to it—will be the primary bicycle route in this segment. An alternative route along North and South Kelly Roads, on the east side of the corridor, provides another opportunity for bicycle access and Class II bike lane development.

Projected Operations/Performance Assessment

Modeling shows that retaining a four-lane configuration is sufficient to support future traffic volumes; improvements to level of service will depend almost entirely on improvements made to the three major intersections in unincorporated Napa County (Jameson Canyon, Soscol, and Carneros), which are discussed separately.

Design Considerations and Physical/Infrastructure Constraints

Much of this segment of the Study Corridor is elevated above the surrounding terrain, crossing smaller roadways, railroad tracks, and the Napa River. Soscol Creek crosses SR 29 south of SR 221. Currently, bicycles are not allowed on the bridge; extending access to cyclists on this segment of the highway, potentially through providing higher railings, is critical for providing continuous access for this mode of travel. In addition to the large Napa River bridge cross-

ing, there are also various drainage and creek crossing improvements west of the Napa River surrounding the Highways 121 and 12 junction.

The PG&E JUA easement that is documented in the records to the south appears to terminate just north of SR 12. Another JUA benefits the Napa Water Company and AT&T in the same vicinity. South of the Highways 121 and 12 junction, there is an overhead utility crossing. At the far north end of this segment, just before urbanized Napa, another JUA benefitted PG&E, however available documents do not indicate whether the easement is recorded.

Intersection 9: SR 29/SR 221 (Soscol)

Current Conditions

Intersection 9, of SR 29 with SR 221 (Soscol), is currently at-grade and signalized, with a free-flow configuration from northbound SR 29 to northbound SR 221. High traffic volumes on this segment of SR 29—exacerbated by commuters entering the roadway from Jameson Canyon Road to the south—cause the intersection to perform at level of service F in both the AM and the PM peak hours.



Rendering of proposed Soscol flyover

Figure 4-21: Partial Grade-Separated Interchange Design - Intersection 9

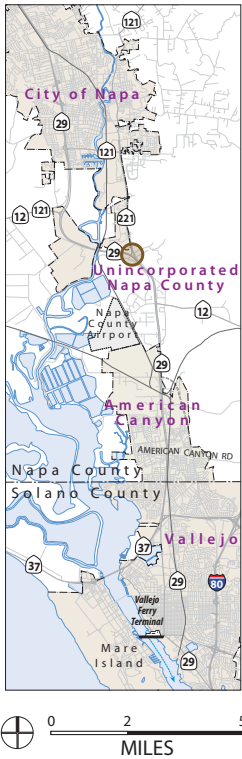


Figure 4-22: Full Grade-Separated Interchange Design - Intersection 9



Alternatives Considered

Caltrans has studied potential improvements to this intersection and is currently completing a Draft EIR that studies two alternatives: a partial and a fully grade-separated interchange. The partial grade-separated solution would involve a flyover in the southbound direction only, allowing southbound traffic on SR 221 to continue free-flow traffic onto southbound SR 29. The traffic signal for other turning movements would be left in place. The fully grade-separated interchange would eliminate the traffic signal and construct a single-lane connector ramp for southbound Soscol traffic to flow onto northbound SR 29, with movement onto Soscol Ferry Road restricted to right-in/right-out only. Figures 4-21 and 4-22 depict the two alternative designs.

Modeling of these two alternatives shows that the partial grade-separated design does not improve intersection operations, whereas the full interchange design improves level of service to A (Table 4-7).

TABLE 4-7: INTERSECTION 9 PERFORMANCE (SR 29/ SR 221)		
Scenario	AM LOS	PM LOS
Existing	F	F
Future (Flyover Only)	F	F
Future (Full Interchange)	A	A

Source: Fehr & Peers, 2013

Proposed Improvements

This study recommends the full interchange configuration for the SR 29/SR 221 (Soscol) intersection, which is consistent with Caltrans' preference.

Projected Operations/Performance Assessment

As shown in Table 4-7, the full interchange would perform at LOS A, thereby also improving roadway level of service on SR 29 north and south of the intersection, and on SR 221 north of the intersection. The LOS values stated in the table represent an average of the northbound and southbound ramp intersections.

Design Considerations and Physical/ Infrastructure Constraints

The EIR for this project has not been finalized; preliminary impacts include a possible visual impact of the elevated structure on the "grape crusher" statue, which lies just northwest of the current intersection and is seen as an aesthetic resource and a key gateway element to the Napa Valley.

TABLE 4-8: INTERSECTION 10 PERFORMANCE (SR 29/SR 12/SR 121)		
Scenario	AM LOS	PM LOS
Existing	D	D
Future No Project (4 Lanes)	F	F

Source: Fehr & Peers, 2013

Intersection 10: SR 29/SR 12/SR 121 (Carneros)

Current Conditions

The northernmost major intersection in the rural highway section of the corridor is that of SR 12/121/29, also known as the Carneros intersection (Intersection 10). Carneros is an at-grade, signalized intersection that performs at LOS D under current conditions. Vehicle volumes east and west on SR 121 during the AM and PM peak hours are around 1,700 in each direction, creating a roadway level of service of F.

Alternatives Considered

Fehr & Peers' initial modeling of future conditions at this intersection showed it performing at LOS F in its current configuration (Table 4-8). At this time, Caltrans has no accepted or adopted improvement strategy (as part of a route concept report or project study report, for example) for the intersection that would significantly improve LOS, e.g. a grade-separated interchange. Caltrans did produce a Project Study Report in 2006 that examined options for a flyover, but these were not carried forward.

Stakeholders for this study expressed interest in testing several concepts for the intersection with the potential to improve performance without needing a grade-separated solution: a roundabout (signalized and unsignalized) and channelization of turning movements. The results are discussed below.

ROUNDAABOUT

Fehr & Peers first tested a roundabout, where the conflicting movements are:

- Northbound left (NBL)
- Southbound thru (SBT)
- Eastbound left (EBL)

Free movements are:

- Northbound thru (NBT) (bypass)
- Southbound right (SBR) (free right; currently right turn on red)
- Eastbound right (EBR) (free right)

The HCM 2010 analysis for roundabouts showed a significant amount of delay and queuing for the SBT and EBL movements. The three-legged configuration of this intersection allows for the NBL movement to enter the roundabout without conflict. However, the high volume of this movement impedes entry of the SBT and EBL movements into the roundabout. A roundabout with more than two approach lanes would require simulation analysis, which Fehr & Peers did not undertake.

Since analysis of a roundabout with more than two approach lanes was not performed, this option is not ruled out. Caltrans requires that roundabouts, as well as other types of controls, be evaluated for intersection modifications.

CHANNELIZATION

Signalized roundabouts are most effective when there are more than four approaches and the departure movements are somewhat random. By contrast, at the Carneros intersection, a signalized roundabout would not operate differently than a standard intersection due to the low number of conflicting movements and discrete departure for each approach. The roundabout would, however, require ROW acquisition; therefore Fehr & Peers did not pursue this solution further.

Instead, the modeling effort focused on modifying the existing intersection with channelization of the northbound through movement and reintroduction of the free right, similar to the roundabout configuration described above. There appears to be room on the SR29 ROW median to include two receiving lanes for the EBL movement, and have it merge with the mainline after reaching highway speeds (Figure 4-23).

The NBT free movement was modeled in Synchro by changing the NBT movement into a free NBR movement. The intersection was tested for sensitivity to the downstream merge of the NBT and EBL movements; it did not affect analysis of the intersection itself. Level of service results indicate that the intersection would operate at LOS F under future conditions. However, as Table 4-8 below shows, while the intersection remains at LOS F, average delay is significantly decreased—by approximately 86 seconds in the AM and 74 seconds in the PM—compared to the no build condition.

Taking out the NBT green phase allows the signal timing to be optimized just to the three conflicting movements (EBL, SBT, & NBL). While this configuration shows improvement, these three movements would continue to operate at LOS F.

CONCLUSION

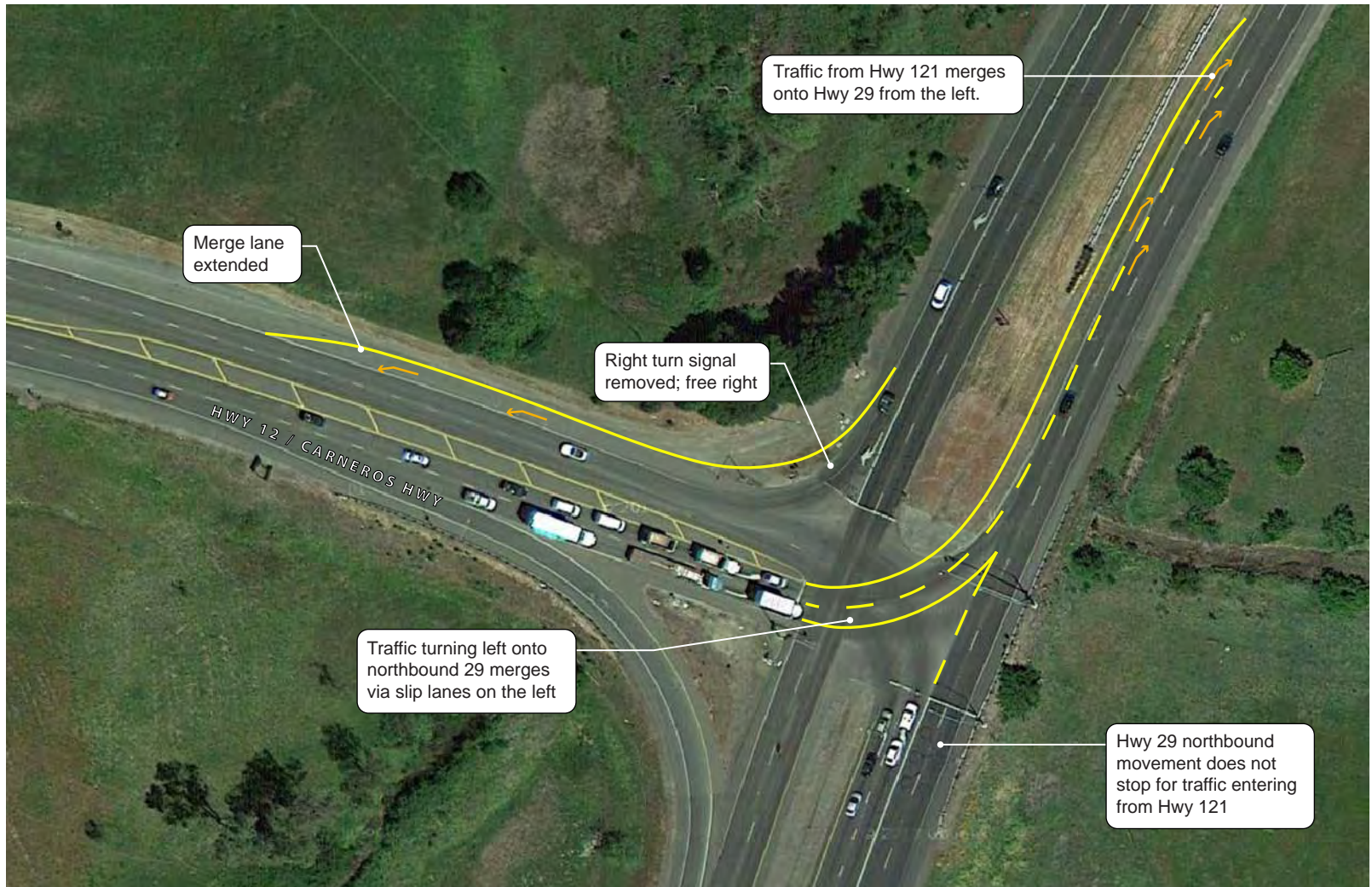
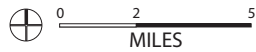
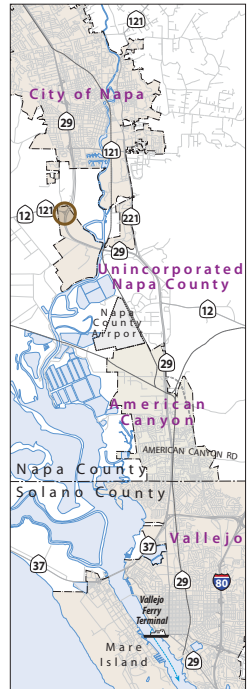
The roundabout (signalized and unsignalized) does not perform better than the baseline future condition. A channelization solution, in which the northbound thru movement on SR 29 moved freely and the eastbound left movement on SR 12 merged via a slip lane into the northbound direction, still performs at LOS F in both peak hours (Table 4-9). However, the average delay in this configuration is reduced by over 60 seconds, indicating some improvement. In order to appreciably improve LOS at this intersection, grade separation would be required. However, as with all interchange designs, this would have adverse effects on alternative modes of travel, would require right of way acquisition, have potentially greater environmental impacts, and require significantly greater funding.

TABLE 4-9: ALTERNATIVE FUTURE PEAK HOUR LOS AND DELAY, CARNEROS INTERSECTION		
Peak Hour	Cumulative Configuration (4 lanes highway)	Free Passby Configuration (4 lane highway)
AM	F, 204 avg delay	F, 119 avg delay
PM	F, 161 avg delay	F, 87 avg delay

Source: Fehr & Peers, 2013

Figure 4-23: Channelization Design - Intersection 10

I 10 SR 29/SR 121/SR 12 (Carneros)



1" = 100'

Proposed Improvements

This study recommends the channelization solution described in the alternatives section above. The primary improvements would be:

- Signal reconfiguration: northbound through movement on SR 29 moves freely, does not stop at light
- Construction of slip lane: eastbound left on SR 121 merges via a slip lane into northbound SR 29
- Signal reconfiguration: create free southbound right from SR 29

Projected Operations/Performance Assessment

Performance for the recommended improvement is discussed in the conclusion section of the Alternatives discussion, above.

Segment 6: Urbanized City of Napa

Current Conditions

The last, northernmost segment of SR 29 is a limited access freeway as the roadway enters the urbanized City of Napa. It continues with two lanes in each direction, and an occasional third lane for merging at regular freeway on and off ramps. Cycling is prohibited. Landscaping is increased, with small trees, large bushes and shrubs taking the place of grass in the median and along the shoulders in both directions. Sound walls separate the freeway from adjacent development. See Figure 4-24.

The freeway segment of SR 29 performs at acceptable levels of service, ranging from B to C between the Carneros intersection and the southern city limits (with volumes ranging from around 1,600 to 2,600) to LOS D in central Napa (with volumes ranging from 2,500 to 3,500) during the AM and PM weekday peak hours.

Through the City of Napa to the northern limits of the Study Corridor, the right of way limits vary as SR 29 passes through various sized regular freeway intersections. There is one segment of about one half mile that is 130 feet, but the rest of the right of way is 150 feet or more for the remainder of the corridor.

Alternatives Considered

The community and project stakeholders generally agreed that this section should remain an urban freeway. No alternative roadway configurations were tested.

Proposed Improvements

Recommended improvements related to this study are limited to aesthetic and wayfinding treatments for this section of the corridor. Major operational improvements in the City of Napa are limited to those outlined in the 2011 update to the City of Napa General Plan.

Projected Operations/Performance Assessment

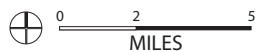
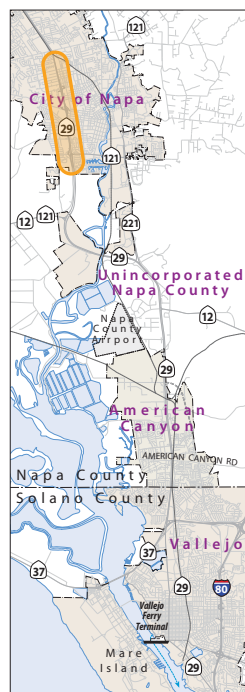
Projected operations are at acceptable levels without further intervention.

Design Considerations and Physical/Infrastructure Constraints

Existing development along this corridor frontage would be major constraint to any future widening of the roadway. In addition, a major drainage crossing of the Napa Creek occurs north of 1st Street. An at-grade railroad crossing also constrains the corridor just before the Redwood Road on/off ramps.

Figure 4-24: Existing Conditions - Segment 6

S6 Freeway in Urbanized City of Napa



- Cycling prohibited
- Median landscaped with small trees and shrubs
- Right of way varies considerably



Existing Conditions

No significant roadway improvements planned beyond those already put forward by the City of Napa. Improvements to highway will be limited to landscaping and signage.

1" = 40'

ACTIVE TRANSPORTATION

Fostering active, or human-powered, transportation—walking and bicycling—is a critical component of the plan for the SR 29 corridor. Active transportation has many benefits: it promotes health and wellness; reduces the number of trips by private automobile, thus also reducing air pollution and greenhouse gas emissions; and contributes to a vital and livable urban environment. The reduction in greenhouse gas emissions associated with shifting travel modes towards active transportation directly contributes to achieving statewide goals for addressing climate change, as set forth in AB 32 and SB 375. Providing for active transportation is also an important goal of California’s Complete Streets legislation, which requires cities and counties to plan for transportation systems that support safe and convenient mobility and access for all modes of travel, including bicycles, pedestrians, and transit.

While the improvements proposed for the segments and intersections in this chapter include descriptions of facilities for pedestrians and cyclists, this section summarizes the entire pedestrian and bicycle network along the corridor in order to provide a broader characterization of the whole system.

Bicycle Access and Mobility

Bicycle facilities along SR 29 are enhanced throughout the corridor. Specific new facilities for bicycles and pedestrians—Class I shared use paths, within the highway right of way but sep-

arated from the automobile travel lanes by and landscape strip—are proposed for the segment from SR 37 to American Canyon Road, and from Napa Junction Road to South Kelly Road. Between American Canyon Road and Napa Junction Road, two options are being proposed: a Boulevard concept that would include Class II bike lanes along the local access lanes, and a Modified Boulevard concept that would continue the Class I design through the center of the city. Class I paths could also be accommodated in the Boulevard concept. In either case, new, dedicated facilities would be provided for cyclists, immediately adjacent to the road, providing convenient access to adjacent businesses and neighborhoods.

South of SR 37, access for cyclists to Downtown Vallejo and the ferry terminal would be provided along Sonoma Boulevard (with specific facilities designated by the Sonoma Boulevard Specific Plan). Additional Class I facilities between the ferry terminal and the SR 29/SR 37 intersection will be provided as part of the Vine Trail route, along the south side of the SR 37 causeway and then down Harbor Drive to the ferry terminal.

North of South Kelly Road, cyclists have two choices: they may continue on SR 29 directly, on the eight-foot shoulder that would be provided in each direction, or they may access the Vine Trail via Airport Boulevard to Devlin Road. Refer to Figure 4-15 for an illustration of this transition. It is also recommended that the highway shoulders be striped as Class



Increasing safety, convenience, and accessibility of active transportation modes along SR 29 is a high priority of community members.



Class I multi-use paths are safest and most conducive to use by recreational walkers and bicyclists.

II bike lanes wherever feasible, consistent with the Napa County Bicycle Master Plan and the American Canyon Circulation Element.

The Vine Trail is a planned Class I bicycle/pedestrian path that will connect the City of Napa to the Vallejo Ferry Terminal, recommended by the Napa County Bicycle Plan (2012), to provide a safe and continuous facility for cyclists traveling between these destinations for commuting and recreation purposes. The Vine Trail will generally follow the SR 29 corridor, but will not occupy any of the right of way. In some instances, it will lie to the east, and in others, to the west, depending on available right of way, connectivity, and appropriateness of the roadways.

The Vine Trail is likely to be the route of choice for recreational cyclists and many commuters; however, some bicycle commuters may still prefer traveling along SR 29 itself, as it is the most direct path from north to south. Wherever the roadway is not a limited access freeway, cyclists will continue to be allowed to travel on the road itself (in an eight-foot shoulder, signed to ensure that access is clear). It is also recommended that the highway shoulders be striped as Class II bike lanes wherever feasible, consistent with the Napa County Bicycle Master Plan and the American Canyon Circulation Element. It is anticipated that this option will appeal only to serious commuters who are comfortable cycling adjacent to fast-moving automobile traffic.

Pedestrian Access and Mobility

Improvements to pedestrian mobility on the SR 29 corridor emphasize increased safety, convenience, and comfort in areas closest to neighborhoods and local destinations, such as shops and schools. Current conditions for pedestrians in the study corridor are at best, discontinuous, and at worst, unsafe. Ameliorating these conditions is a particularly high priority in central American Canyon, where SR 29 bisects the community and creates a significant physical barrier to residents' and visitors' ability to travel safely on foot.

The American Canyon community expressed a desire to improve pedestrian access and safety, and the city's recently updated Circulation Element also includes recommendations for pedestrian overcrossings in several places along the corridor in the central part of the city. The Element preliminarily identifies three possible locations. Other possible solutions include providing underpasses. Improved access across the highway is particularly important near American Canyon Road, as students on the western side must cross to reach American Canyon High School.

At the southern end of the corridor, pedestrian mobility is addressed through provision of Class I shared use bicycle/pedestrian paths through northern Vallejo and through to American Canyon Road. From American Canyon Road to Napa Junction Road, the nature of pedestrian facilities will depend on which option the City

proceeds with: sidewalks would be provided as part of the Boulevard option, and continuation of the Class I paths would be provided as part of the Modified Boulevard option. At-grade crossings will also be enhanced, with appropriate signal timing, enhanced crosswalk striping, and pedestrian refuges at medians. Urban design guidelines also recommend adequate lighting, street furniture such as benches and trash cans, and landscaping to enhance safety and comfort.

From Napa Junction Road to Jameson Canyon Road, where the recommendations are for the road to be improved as a Parkway, Class I pedestrian/bicycle paths continue on both sides. North of Jameson Canyon Road, the highway and the adjacent parcels take on a rural character, with very low density development of that is primarily agricultural and industrial in nature. From this point north, pedestrian access is not provided within the SR 29 right of way. Pedestrians wishing to continue north towards the City of Napa would continue on the Vine Trail, which continues north from this point, parallel to the highway on the west.

TRANSIT SERVICE

Bus Rapid Transit (BRT) Potential

Overview

Bus Rapid Transit (BRT) is typically defined as a flexible, rubber-tired rapid-transit mode that combines stations, vehicles, services, running ways, and Intelligent Transportation System (ITS) elements into an integrated system with

a strong positive identity that evokes a unique image.¹ BRT service should be context sensitive and complement the built environment it serves; many BRT features and components can be implemented incrementally. Compared to local bus service, BRT improves upon speed, reliability, convenience, and identity. Full application of BRT is regularly compared to light rail transit (LRT) on rubber tires, but with greater operating flexibility and potentially lower capital and operating costs. This section explores the suitability of BRT in the SR 29 Corridor and investigates an incremental approach based on built environment thresholds.

Features

The key features of BRT include dedicated running ways, distinctive stations, distinctive easy-to-board vehicles, off-vehicle fare collection, use of ITS technologies, and frequent all-day service. The spacing of stations along freeways and busways typically ranges from 2,000 to 7,000 feet. Spacing along arterial streets ranges upward from about 1,000 feet to over 4,000 feet. Table 4-10 presents the typical features of BRT systems.

Incremental Development

BRT can be phased, with non-capital intensive service improvements implemented prior to major transit and roadway infrastructure changes. Many transit agencies operate “Rapid” style service, which embodies many BRT ele-



Currently, the Study Area is served by traditional bus. Adjacent densities are not yet high enough to support BRT.

¹ TCRP Report 90, *Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit*, Transit Cooperative Research Program, 2003.

TABLE 4-10: GENERAL CHARACTERISTICS OF BUS RAPID TRANSIT	
Feature	Description
Dedicated running way	Curb lane bus only, median bus lanes, grade separated. Queue jumps, queue bypass.
Stations	High capacity, pedestrian crossings, low floor boarding, fewer stops
Identity and branding	Branding of infrastructures, vehicles, and routes
Vehicles	Low floor, high capacity, articulated
Fare collection	Off-board fare collection
ITS	Signal priority, signal preemption, AVL, APC, real time passenger information (e.g. NextBus)
High frequency service	5-15 min peak service, service at least 16 hours/day
Service and reliability	Greater reliability and higher operating speeds than local bus routes
Even Boarding	Platforms and/or low floor bus-curb loading to improve boarding and alighting times

Source: Fehr & Peers, 2013

ments but does not include major capital investment such as dedicated running ways or enhanced stations. Metro Rapid (Los Angeles), VTA Rapid (Santa Clara County), AC Transit Rapid (Alameda County), and RapidRide (Seattle) are examples of Rapid or (“BRT 1”) systems. Service elements of Rapid or BRT 1 type service include:

- Low floor, high capacity, articulated vehicles with unique branding
- Signal priority and real time passenger information
- Fewer stops
- Reliability and operating speed improvements
- Mixed flow or peak period bus lanes

“Full” BRT/BRT 2 is capital intensive and typically includes dedicated running ways comparable to LRT service. In addition to Rapid style service elements, Full BRT typically involves major construction and ROW acquisition. Full BRT may serve as a means of establishing the transit market for a possible future rail line. In addition to the features identified above for Rapid/BRT1 service, the following features characterize Full BRT/BRT 2:

- Dedicated lanes – center or side running
- Queue jump/queue bypass lanes
- Enhanced stations
- Off-board fare collection

Cost

BRT costs reflect the location, type, and complexity of construction. In TCRP Report 90, which studied 26 systems, reported median costs were \$6.6 million per mile for arterial median busways (Full BRT/BRT 2) and \$1 million per mile for mixed traffic or curb bus lanes (Rapid/BRT 1).²

Transit Market

BRT is best suited for urban areas and should serve demonstrated transit markets. Urban areas with more than a million residents and a central area of employment of at least 75,000 are good candidates for BRT. These areas generally have sufficient corridor ridership demands to allow frequent all-day service.

VTA (Santa Clara County) developed service design guidelines for determining feasibility of BRT along arterial corridors (Table 4-11). These guidelines serve as a proxy for the land use intensities (population, employment and performance) needed along the SR 29 corridor for viable BRT service.

Currently, typical residential densities along the SR 29 Corridor range, on the high end, from pockets of development up to 20 dwelling units per acre in Vallejo to 5-12 dwelling units per acre in American Canyon, and on the low end, less than 1 dwelling unit per acre in unincorporated

² TCRP Report 90, *Bus Rapid Transit Volume 1: Case Studies in Bus Rapid Transit, Transit Cooperative Research Program, 2003.*

TABLE 4-11: GUIDELINES FOR BRT FEASIBILITY

Service Standard	Rapid/ BRT 1	Full BRT/ BRT 2
Boardings per revenue hour	45	55
Daily Boardings per route mile	200	350 to 475
Residential density (DU/acre)	12-16 (min) to 30-50 (optimal)	
Employment density (FAR)	1.0 (min) to 2.0 (optimal)	

Source: Fehr & Peers, 2013

Napa County. Residential densities in the City of Napa within a half-mile of the corridor are typically less than 8 dwelling units per acre with pockets of denser multifamily development.

Non-residential density exceeds 2.0 FAR in Downtown Vallejo and some areas of the City of Napa. However, most non-residential development in northern Vallejo and American Canyon is developed at less than 1.0 FAR, characterized by single-story commercial centers with surface parking. Business parks in the north of American Canyon and near the airport are at a similarly low intensity in order to comply with airport land use compatibility restrictions.

While development density/intensity in the study corridor does not support BRT at this time, it should be noted that the roadway improvements proposed in this report do not preclude implementation of BRT in the future. Through American Canyon, the Modified Boulevard concept would lend itself more easily to creation of shared BRT/HOV lanes than the Boulevard concept.

Passenger Rail

The passenger rail concept for the SR 29 Corridor is still conceptual at this point, but it should be recognized as a potential transportation alternative. The route would travel from (or at least near to) the Vallejo Ferry Terminal to the town of St. Helena. The projected ridership would not meet standard thresholds for established public funding sources. In addition, Napa County is located in a Small Urbanized Area (UZA) and is only eligible for generating 5307 funds based on population and not on revenue-miles. Likewise, as a small UZA, Napa would not generate FTA 5309 fixed guideway funds, which is a critical fund source for continued maintenance of the system. Alternatively, interest has been shown in the possibility of private funding for elements of a rail solution in the corridor.

The following briefly presents advantages and disadvantages to pursuing passenger rail for the study area.

Advantages:

- Greater reliability, shorter travel times compared to bus transit, potentially automobile (esp. during peak periods with high levels of congestion)
- Ability to attract choice riders, serve tourist market as well as commute and other home based or non-home based trips
- Significantly greater ridership than corridor bus service

Disadvantages:

- High capital and operating costs
- Land acquisition may be needed for stations and park-and-ride
- First mile/last mile concerns – ¼ mile to ½ mile typical maximum walking distance from rail transit, low density pattern of Napa County would make many destinations unreachable from stations (NCPTA could increase feeder bus service, which would also come at a cost)

Transit Recommendations for the SR 29 Corridor

Given the current characteristics and developed density of the study area, the SR 29 Corridor in Napa County is not likely to be a candidate for BRT service without major policy intervention to develop a dense adjacent built environment. There is potential for both American Canyon and Vallejo to see increases in density through proactive policy planning, as both cities have designated Priority Development Areas (PDAs) by ABAG/MTC, meaning that they are intended to intensify so as to better support transit. ABAG/MTC give priority to PDAs when issuing technical assistance and capital grants, in exchange for a community's commitment to compact growth and development at densities and configurations that support alternative modes of travel.

Transit service on SR 29 provided by NCTPA currently includes local (Route 11) and express (Route 29) service. Alternative options to improve speed, reliability, and customer experience of the existing transit services along the corridor and thus increase ridership include:

- Allow transit to operate in the shoulder to bypass congestion
- Construct queue bypass lanes at congested intersections
- Provide real time passenger information and enhanced stops
- Develop Park and Ride lots at strategic locations

While a dedicated bus lane or High Occupancy Vehicle (HOV) lane is not recommended for the corridor at this time, the six lane configuration of the highway from Jameson Canyon Road through American Canyon would not preclude development of a High Occupancy Toll (HOT) or HOV lane, or the development of a BRT system in the future. This possibility is left open for further evaluation in the future, as both land uses and travel along the corridor intensify.

Additional opportunities exist to improve transit frequency along the corridor by partnering with Soltrans, the public transit service provider that operates in Vallejo that already provides service to the Wal-Mart in American Canyon. With some modest capital investments such as park and ride lots, queue jumps at strategic locations, and signal pre-emption, bus transit

operations in the corridor could be significantly improved and potentially encourage modal shifts from cars to transit.

In addition, it is anticipated that other roadway and intersection improvements, described in Section 4.2, will also result in improved bus service along the corridor. When buses do not operate in dedicated lanes, their speed and schedule reliability is significantly affected by the automobile traffic among which they travel. By improving overall traffic conditions along SR 29, bus transit also benefits.

Finally, similar to walking and bicycling, use of public transit contributes to reducing greenhouse gas emissions and supports State goals for addressing climate change. Together with additional programs to reduce traffic congestion and dependency on single-occupancy vehicles, such as Transportation Demand Measures, the recommendations in this plan support the greenhouse gas reduction goals of Napa County and other participating jurisdictions.

COMMUNITY CHARACTER RECOMMENDATIONS

Overall Design Elements of a Gateway Corridor

The Gateway Corridor Improvement Plan focuses on creating an attractive and functional entry to Napa County and enhancing the image and economic vitality of corridor communities. A unifying “gateway” theme should be explored in future design treatments, taking into account Caltrans guidelines for signage.

As noted previously in the Plan, each of the communities has somewhat different visions and policies in place: for Vallejo, SR 29 is a community entry and transition area that includes a mix of residential, commercial, and open space land uses; in American Canyon the corridor extends through the heart of the community, and is a potential showpiece for this rapidly-growing young city; in Napa, SR 29 is a parkway-like edge for the historic urbanized area; County lands between American Canyon and Napa are a complement to up-County’s agricultural and light industrial land uses, and open space landscape.

Each of these different visions is expressed in the Roadway Type(s) established to guide circulation planning and roadway design improvements. The visual quality of buildings, site improvements, and landscape is important as an expression of the character of local communities and Napa County. The general guidelines that

follow are intended to help ensure that future land use, development, and roadway improvements complement one another to fulfill the vision for each specific corridor area. The guidelines provide basic parameters that bolster, supplement, and/or parallel existing urban design policies.

Urban Design Guidelines by Roadway Type

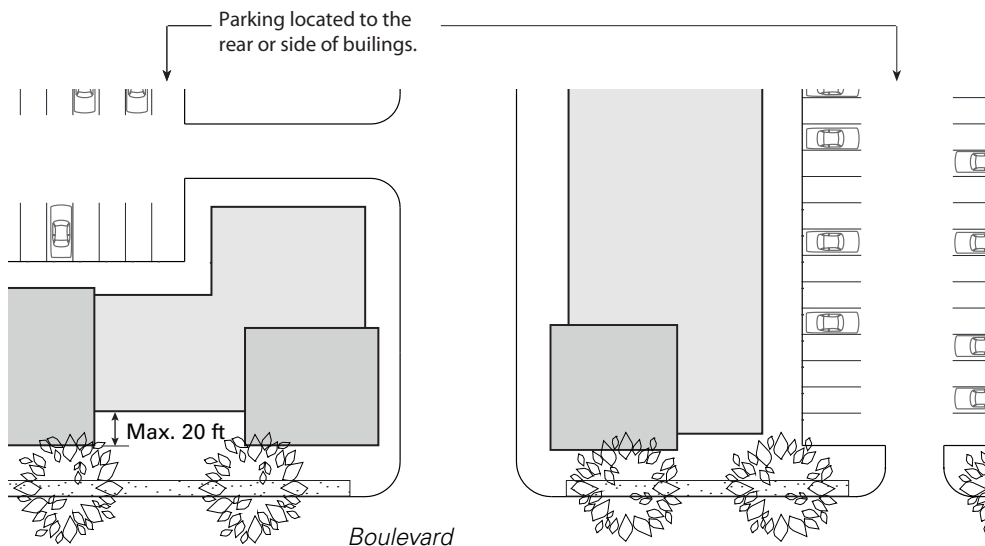
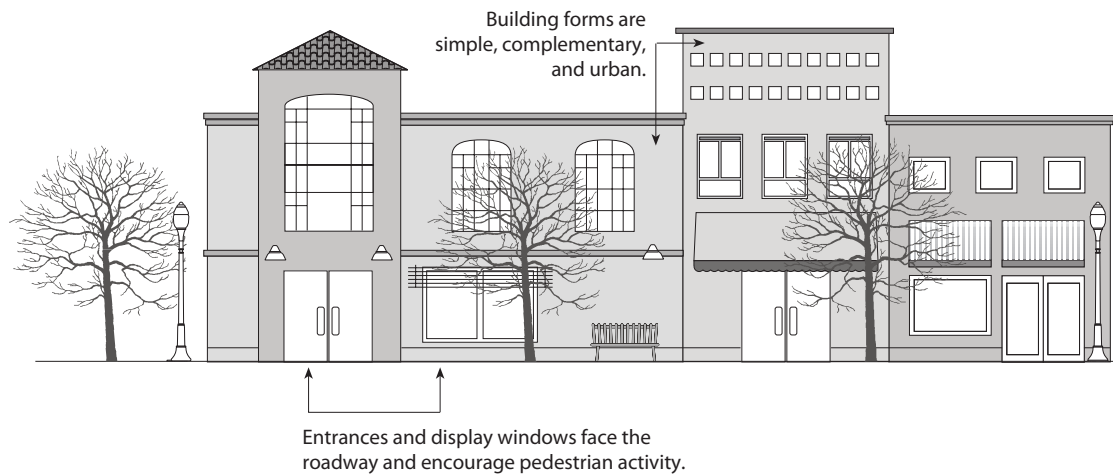
Boulevard and Modified Boulevard

The Boulevard and Modified Boulevard roadway types both are intended to create public spaces that are active and attractive, sufficient to support a consistent frontage of high-quality mixed-use development. Street-facing buildings, particularly street-facing first floor commercial space, and a strong and regular arrangement of street trees and streetlights, are fundamental elements that give this roadway type its character.

- *Buildings* – Buildings should face the roadway, with attractive and visible main entrances and display windows that encourage pedestrian activity and are characteristic of a boulevard street. Facades should parallel sidewalks, with a minimum two-story height to frame the street space and minimal massing changes and/or building step-backs along the frontage. The highest quality windows, façade surface and roof/cornice materials should be displayed along SR 29. Building forms should generally be simple, complementary, and urban, typical of a downtown commercial area, rather than dramatic, one-of-a-kind structures.
- *Setbacks* – Commercial buildings should generally abut expanded frontage sidewalks in order to create a consistent boulevard building frontage, particularly if they contain first floor commercial space. Office and residential buildings may be set back to create a small forecourt, but setbacks should be no greater than 20’.
- *Parking* – In order to support a consistent building frontage, surface parking lots should be located behind or to the side of buildings, not in front. Alternatively, as local frontage driving lanes do not include curbside parking, surface parking should be located to the side of buildings to support a street-facing/building corner main entrance; rear parking lots typically result in rear-facing main building entrances.
- *Landscape* – Sidewalk and frontage lane street trees provide a visual structure along the roadway. Planters and other smaller scale landscape features may be appropriate along frontage sidewalks; however, in general, frontage sidewalks should be gracious and open, offering visibility of frontage businesses and signs from SR 29 and the frontage lane (if present). Surface parking lots that abut frontage sidewalks should include “orchard” shade tree plantings, trellises, and/or other features to screen parking areas and low, attractive fences or walls to frame the sidewalk/street space.



Street landscaping and lighting concepts for boulevard roadway types



Building form, parking location, and setbacks for boulevard roadway types

- *Lighting* – The Boulevard should be bright and inviting, with closely-spaced pedestrian-oriented street lights along frontage sidewalks. Attractive façade and sign lighting is encouraged. Transit stops and other important locations should be highlighted with special lighting. All lights should include “high cutoff” fixtures that direct illumination toward road and sidewalk surfaces and reduce glare and dark sky impacts.
- *Street Furniture and Amenities* – Benches, bicycle racks, trash receptacles, canopies/shade structures and other elements that make sidewalk frontages attractive and pleasant are recommended. In general, amenities should be concentrated near intersections and other areas with high levels of pedestrian activity.
- *Transit* - Bus stops should include attractive, highly visible shelter structures that protect patrons from the elements and complement adjacent commercial businesses. Ideally, these and other facilities would be signature urban design elements that promote a positive district identity and image.

Parkway

The Parkway roadway type relies on attractive, relatively dense, and informal landscape plantings to blend, screen, and/or enhance a range of adjacent land use and development types, from light industrial to office and multi-family housing. This park-like landscape zone provides the

unifying element for this roadway type, rather than buildings and/or other features.

- *Buildings* – In general, buildings should face SR 29, as recommended for the Boulevard roadway type. Buildings should not abut frontage sidewalks, but should generally be sited with the front façade parallel to SR 29. Architectural forms may vary from urban to suburban, traditional or contemporary. Materials and detailing should reflect the general Napa Valley character expressed in the best recent construction in the area.
- *Setbacks* – A generous landscape setback area is the unifying element of the Parkway roadway type. In general, building and parking area setbacks should range from 30 to 50 feet from the frontage shared use path. An informal planting of large shade trees and understory species should be established that creates a green edge along the roadway and frames frontage property development.
- *Parking* - Surface parking lots should be located behind or to the side of buildings, not in front, to maintain a consistent area of setback landscaping along the frontage. Surface parking lots should include “orchard” shade tree plantings, trellises, and/or other features to screen parking areas and reinforce the parkway character.
- *Landscaping* – The Parkway concept relies on park-like landscaping between the roadway and development. In general, this would consist of lawn areas, shade trees, and garden

areas with flowering trees, shrubs, and other ornamental plants. However, in the SR 29 corridor, this approach needs to be adapted to address potential drought conditions and water conservation policies. Drought tolerant and/or native grasses, trees, and shrubs should be employed, creating a “dry California” parkway landscape.

- *Lighting* – High roadway light levels are not required in Parkway areas. Light fixtures should be provided at regular intervals, but light levels should be noticeably lower than those provided for the Boulevard type areas. However, consistent pedestrian- and bicycle-oriented lighting should be provided along the frontage shared use path, with supporting illumination provided by adjacent buildings, and related parking areas, walkways, and/or other facilities. All lights should include “high cutoff” fixtures that direct



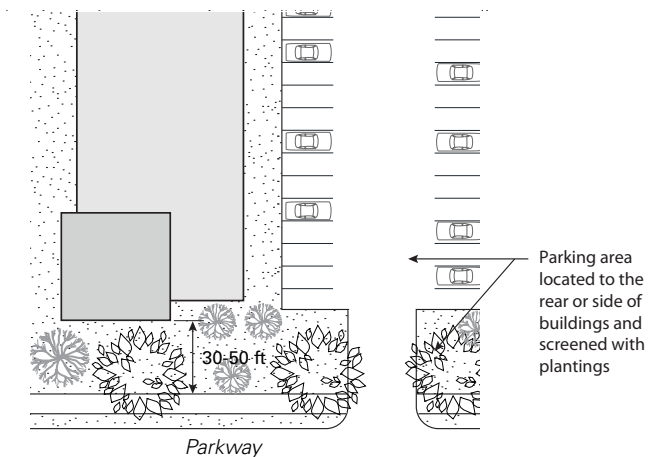
Landscaping for parkway roadway types

illumination toward road and sidewalk surfaces and reduce glare and dark sky impacts.

- *Street Furniture and Amenities* – Benches, trash receptacles, bus shelter/shade structures, and other amenities should be provided along the shared use path at regular, approximately quarter-mile, intervals.

Rural Highway

The Rural Highway roadway type occurs between communities and/or between other roadway types. Ideally, it serves as a border area that puts the agricultural landscape of Napa County on display. Adjacent agriculture and agriculture-related structures and facilities should be visible and attractive, with frontages lined by grape vine trellises, agricultural-type fencing, and/or other elements typical of the Napa Valley’s rural and wine country areas.



Parking location and setbacks for parkway roadway types



Agricultural landscape, building setback and character along rural highway



Landscaped swale along rural highway

- *Buildings* – The Rural Highway roadway type is not dependent on buildings or site improvements per se for urban design character. The agricultural landscape is the primary element. Buildings are anticipated to be primarily functional in nature; e.g. barns, storage and equipment sheds as needed to support agricultural activities. Some industrial buildings may also be present. However, buildings should be attractive examples of their particular type, consistent with the best examples in other agricultural areas of Napa County, and buildings and/or fencing should be sited so that outdoor storage areas, equipment-servicing yards, and other potentially unsightly facilities are screened from view from the roadway.
- *Setbacks* – Agriculture-related buildings and outdoor work areas should have significant setbacks from SR 29; a minimum of 100' is recommended to allow for agricultural uses adjacent to and along the roadway.
- *Parking and Outdoor Storage* – Large parking areas are not anticipated adjacent to the Rural Highway condition. Smaller employee parking and outdoor storage/work areas should be screened from view and setback from the roadway frontage, as noted above. If large parking areas are required—e.g., to serve tasting rooms—shade tree plantings should be provided, similar to recommendations for the Parkway.
- *Landscaping* – A planted swale and frontage shade trees would be provided as part of

roadway improvements. On-site landscaping is not as important or as strongly recommended as it is for the other roadway types. If on-site landscaping is provided, it should follow the recommendations for the Parkway roadway type, above.

- *Lighting* – Lighting in the Rural Highway should be minimal, provided only for security and/or to support agricultural activities. All lights should include “high cutoff” fixtures that direct illumination toward road and sidewalk surfaces and reduce glare and dark sky impacts.

Implementing Community Character Recommendations

The community character recommendations described here are best implemented through the development of design guidelines and/or amendments to individual jurisdictions' zoning ordinances. As American Canyon proceeds with the Specific Plan for the PDA area along its segment of the corridor, these recommendations should be reflected through community design policies and implementing ordinances. American Canyon's Specific Plan should also consider evaluate increases in allowable density and housing along the corridor in order to meet the PDA housing requirement and support increased transit use, per MTC's requirements for the PDA designation, so as to make the urban environment along the Modified Boulevard segment more viable.

5 IMPLEMENTATION

This chapter provides planning-level cost estimate of the two alternative concepts, potential funding sources, phasing or priorities for undertaking improvements, and the roles and responsibilities of different agencies.

PROJECT COSTS AND FUNDING

In order to help establish a general understanding of the potential infrastructure and associated costs required to facilitate development of the proposed program, BKF Engineers completed a “planning-level” assessment of construction costs for the improvements described in Chapter 4.

This section includes a summary of methodology and assumptions for the cost estimation, as well as a summary table of results. A complete memorandum and detailed cost tables are included as Appendix D.

Methodology and Assumptions

In order to document existing improvements and right-of-way available along the study corridor, BKF first reviewed and compiled available Caltrans record maps and report documents in and around the Study Corridor. BKF compared record documents with aerial photography as possible to align the records with current improvements. Recommendations for future investigation are provided to verify existing conditions as well as for additional studies necessary to evaluate the impact of specific proposed improvements along the Study Corridor.

In assigning estimated costs for proposed improvements, BKF assumes that the existing utility and roadway infrastructure will be retained and utilized to support future development to the extent possible. Where existing infrastructure is in conflict with the proposed improvements, is in disrepair, or does not meet the demands of the redevelopment, it is anticipated that it will be replaced and/or upgraded with new infrastructure that will meet project demands. Costs for right of way acquisition, which are highly variable, were not included in this analysis.

Roadway Segments

Various modifications to roadway segments are proposed along the Study Corridor in order to improve traffic conditions for all modes of travel; vehicles, bicycles and pedestrians. The cost analysis primarily utilizes street cross-sections for the proposed roadway improvements as the basis for the estimate. Costs per linear foot of street infrastructure are estimated using recent cost information. The analysis provides order of magnitude cost summaries and includes soft costs for Design, Inspection, Staking, Construction Administration and Project Management.

Intersections

BKF considered improvements proposed for Intersections 8, 9, and 10. Although basic analysis has been performed to identify general improvements, additional, more detailed traffic studies, along with geotechnical and structural analysis are necessary to fully scope the design. As such, costing of each interchange reflects only a gross “order of magnitude” cost based on an assumed complexity for each intersection in relation to one another. Two of the pro-

posed intersection improvements, Intersection 8 (Airport Boulevard/ Jameson Canyon) and Intersection 9 (the Soscol Flyover), have already been studied by Caltrans. The cost estimates prepared by Caltrans are included in this estimate. A second structural option consisting of a “double-teardrop” intersection for Intersection 8 is also given an associated order of magnitude cost based on similar projects.

The improvements proposed at Intersection 7 (American Canyon and South Kelly Road) consist primarily of signal modifications and roadway striping along with some pavement adjustments to improve bicycle and pedestrian access. Stormwater quality improvements associated with these intersections are assumed to be mitigated by improvements within the adjoining segments. Implementation of the Boulevard option at American Canyon Road along Segments 2 and 3 would necessitate additional signal improvements at this intersection. Costs associated with these signal improvements are included under the traffic signal modification work for Segment 2.

The proposed intersection modifications at Intersection 10 (Highway 12 and 12I, also known as Carneros), include at-grade lane and signal modifications. Since there are no roadway improvements proposed to the north or south of this intersection, stormwater quality mitigation for the new pavement will need to be handled by the intersection project directly. It is assumed that overall existing drainage patterns will not be impacted by the proposed improvements.

Cost Estimation

Figure 5-1 shows a summary table of cost estimation, with two totals provided: one assuming that the Parkway/Modified Boulevard options were chosen for Segments 2 and 3 (\$324,874,000) and one assuming that the Boulevard option was chosen for Segments 2 and 3 (\$349,476,000). The cost difference is due to the wider cross-section required for the Boulevard option through Segment 3 and the addition and modification of more traffic signals in Segments 2 and 3 to properly control the Boulevard configuration.

It should be noted that these estimates do not include right of way acquisition costs. The exception is the interchange improvements for Intersections 8 and 9, where costs were prepared by Caltrans and right of way acquisition was included in the lump sum.

Funding Sources

Federal

SURFACE TRANSPORTATION PROGRAM/ CONGESTION MITIGATION AND CLEAN AIR PROGRAM


Federal transportation funding, which accounts for approximately 13 percent of the funds available to Napa, comes mostly from the Highway Trust Fund (HTF) fuel excise tax. This tax has been set at 18.4 cents per gallon on gasoline and 24.4 cents per gallon on diesel fuel for the past 20 years, with no adjustment for inflation. It is important to note that inflation in construc-

tion costs has been even higher than the overall national rate of inflation. This has resulted in significant erosion of the effectiveness of these federal funds.

For the purposes and projects described in this study, the most pertinent parts of the Federal Funding are the **Surface Transportation Program (STP)** and the **Congestion Mitigation & Air Quality (CMAQ)** fund. Specific funding levels in these programs is set approximately every six years, when the U.S. Congress adopts a surface transportation act, currently “Moving Ahead for Progress in the 21st Century,” or “MAP-21” This bill is Congress’ authorization to spend tax dollars on highways, streets, roads, transit and other transportation related projects. The majority of surface transportation act funding flows to the states, and in California these funds are administered by Caltrans. However, Caltrans assigns a significant portion of the STP and the CMAQ to the state’s Regional Transportation Planning Agencies (RTPA). For the Bay Area, that entity is the Metropolitan Transportation Commission (MTC).

MTC adopts policies and guidelines for programming the Bay Area’s STP and CMAQ funds to transportation needs according to the priorities of its Regional Transportation Plan. Funding from these two programs in the Bay Area is approximately \$160 million annually, of which Napa jurisdictions have received roughly \$1 million per year. Most of this funding has been used for maintenance of existing infrastructure and for smaller capital projects.

Figure 5-1: Cost Estimate Summary Table

 <div>ENGINEERS / SURVEYORS / PLANNERS</div>		Highway 29 Gateway Corridor INFRASTRUCTURE COST ANALYSIS February 21, 2014						
ITEM		DESCRIPTION	UNITS	UNIT COST	UNIT COST	QUANTITY	Parkway Options	Boulevard Options
							COSTS	COSTS
A INTERCHANGE IMPROVEMENTS								
1		SR 29 / American Canyon	LS		\$150,000	1	\$150,000	\$150,000
2		SR 29 / South Kelly Road	LS		\$218,000	1	\$218,000	\$218,000
3		SR 29 / Airport Blvd./Jameson Canyon	LS		\$73,100,000	1	\$73,100,000	\$73,100,000
4		SR 29 / 12/221 (Soscol Flyover)	LS		\$48,400,000	1	\$48,400,000	\$48,400,000
5		SR 29 / 12/121 (Carneros)	LS		\$472,000	1	\$472,000	\$472,000
INTERCHANGE SUBTOTAL							\$122,340,000	\$122,340,000
B ROADWAY SEGMENT IMPROVEMENTS								
				Parkway		Boulevard		
1		Seg. 2 - Option 1: Hwy 37 to American Canyon Road (143' ROW)	LF	\$2,800		8,275	\$23,170,000	
1b		Seg. 2 - Option 2: Hwy 37 to American Canyon Road (150' ROW)	LF			8,275		\$28,962,500
		Seg. 2 - Opt. 2: Traffic Signal Modification	EA		\$150,000	4		\$600,000
2		Seg. 3 - Option 1: American Canyon Road to Napa Junction Road (176' ROW)	LF		\$4,500	6,900		\$31,050,000
		Seg. 3 - Opt. 1: Traffic Signal Addition	EA		\$150,000	2		\$300,000
		Seg. 3 - Opt. 1: Traffic Signal Modification	EA		\$300,000	1		\$300,000
		Seg. 3 - Opt. 1: 1,200 LF Undergrounding of 25' wide Drainage Detention Swale	EA		\$5,000,000	1		\$5,000,000
2b		Seg. 3 - Option 2: American Canyon Road to Napa Junction Road (151' ROW)	LF	\$3,700		6,900	\$25,530,000	
3		Seg. 4a: Napa Junction Road to South Kelly Road -Overpass (151' ROW)	LF	\$3,500		2,940	\$10,290,000	\$10,290,000
		Seg. 4a: Southern Pacific RR Pedestrian Bridge Overpass Structure	EA	\$10,000,000		1	\$10,000,000	\$10,000,000
3		Seg. 4a: Napa Junction Road to South Kelly Road -At-Grade (151' ROW)	LF	\$3,400		5,190	\$17,646,000	\$17,646,000
4		Seg. 4b: South Kelly Road to Hwy 12/Jameson Canyon (142' ROW)	LF	\$3,300		3,960	\$13,068,000	\$13,068,000
5		Seg. 5: Hwy 12/Jameson Canyon to City of Napa Limits (168' ROW)	LF	\$450		17,540	\$7,893,000	\$7,893,000
ROADWAY IMPROVEMENTS SUBTOTAL							\$107,597,000	\$125,109,500
C TRAIL IMPROVEMENTS								
1		Seg. 4a: Trail Connection to Devlin Road	LF		\$700	1,000	\$700,000	\$700,000
TRAIL IMPROVEMENTS SUBTOTAL							\$700,000	\$700,000
TOTAL CONSTRUCTION COST							\$230,637,000	\$248,149,500
Design, Soft Costs, Mapping						(18%)	\$41,514,700	\$44,666,900
Inspection, Staking, C/A						(15%)	\$34,595,600	\$37,222,400
Project Management						(8%)	\$18,451,000	\$19,852,000
GRAND TOTAL							\$325,198,000	\$349,891,000
Alternate Improvement Options								
3a		SR 29 / Airport Blvd./Jameson Canyon - Teardrop Alternate	LS		\$20,000,000	1	\$20,000,000	\$20,000,000
Notes:								
1 Items A3 and A4 are Caltrans estimates and do include ROW acquisition costs.								
2 Costs associated with ROW acquisition are not included in these estimates unless otherwise noted.								
3 Alternate Item 3a would be in lieu of item A3 for the Airport Blvd./Jameson Canyon intersection. Estimated costs are an order of magnitude estimate based on a similar project. ROW acquisition is not included.								
4 Estimates do not include construction phasing, construction permitting, or traffic control implementation.								

Most recently, MTC has distributed these revenues based on Regional Housing Needs Assessment and each county's housing allocation. Napa is the smallest county in the Bay Area and is characterized by pockets of development with strong urban growth boundaries to preserve agriculture. Consequently, Napa's potential for development of new housing is significantly constrained, and the potential revenue generated from this program is projected to remain relatively small. In addition, Napa's jurisdictions rely heavily on these funds to make improvements to Napa's federally eligible roadways or federal-aid network.

MTC creates other programs from its share of STP/CMAQ. One of those programs is the Transit Incentive Program (TIP), which apportions funding to increase transit ridership and to improve system efficiencies. This funding is determined by a formula through which NCTPA receives roughly \$120,000 per year. The funds could be used to make transit improvements in the corridor.

TRANSPORTATION INVESTMENTS GENERATING ECONOMIC RECOVERY (TIGER)

Another federally funded program is the discretionary Transportation Investments Generating Economic Recovery (TIGER) program. The TIGER program holds the greatest promise for funding this project. The program started in 2009 as part of the economic recovery package passed by Congress and has continued as a key transportation discretionary program through-

out the Obama administration. Revenues for the program are appropriated by Congress are therefore subject to sequestration limitations. That said, in most years, Congress has funded it at between \$300 and \$500 million annually, and some awards for individual projects have been in excess of \$100 million.

FEDERAL TRANSIT ADMINISTRATION (FTA) REVENUES

NCTPA receives several sources of Federal Transit Administration (FTA) funds, most of which, such as the FTA Section 5307 funds, are relied upon to operate the existing transit service. However, several smaller FTA funding programs have potential to fund transit elements of the SR 29 Corridor Improvement program.

OTHER POTENTIAL FEDERAL REVENUES

From time to time the Federal government has developed programs to address current events. For example, after the 9/11 events, Congress authorized and funded security programs for transportation. More recently, in response to the 2008 recession, Congress passed the American Recovery and Reinvestment Act (ARRA) of 2009, which provided one-time infusions of Federal funds for infrastructure investments to stimulate the economy. Transportation needs now significantly exceed the revenues generated from the Highway Trust Fund and there is significant resistance to adjusting the gas tax. This could result in new programs being funded from the general fund or other sources.

State

STATE TRANSPORTATION IMPROVEMENT PROGRAM AND THE STATE HIGHWAY OPERATIONS AND PROTECTION PROGRAM

The State Transportation Improvement Program (STIP) and the State Highway Operations and Protection Program (SHOPP) are two key sources for funding the SR 29 Corridor Improvement project. The source of these funds is the State gasoline excise tax, sales tax on gasoline, truck weight fees, a portion of the state sales tax and other fees.

Distribution of State Funds is complex and is primarily defined by Senate Bill 45, which establishes the program structure and distribution formulas for most state transportation funds. In addition to the large infrastructure funds mentioned above, this includes a gas tax subvention funds for local street and road maintenance and operations.

The most significant State source of capital funding is the STIP program, which funds regional and interregional capital improvement programs that are approved by the California Transportation Commission (CTC). The STIP is divided into two segments. The larger program is the Regional Transportation Improvement Program (RTIP), which comprises 75 percent of the STIP program. The remaining 25 percent is the Interregional Transportation Improvement Program (ITIP). The RTIP is a five-Year program containing county priority projects. Each county's share is based 25 percent on state highway mile-

age and 75 percent on population. The Interregional Transportation Improvement Program (ITIP) encompassing interregional projects are nominated by Caltrans. All RTIP and 40 percent of ITIP funds are subject to a North/South (40/60 percent) split.

Napa County's share of the RTIP has generally been around \$2 million per year. Some of the projects in this plan may be eligible for some ITIP funding, if the interregional significance of the project can be demonstrated. Similar to the STP/CMAQ program, Napa's jurisdictions rely heavily on RTIP funds to make enhancements to the federal-aid road network in Napa County.

The ITIP and SHOPP show greater promise for funding SR 29 improvements. The RTIP is also a potential funding source; however, the revenues would need to be advanced from future RTIP cycles.

CAP AND TRADE

The California legislature passed AB 32 in 2006 requiring the state's Air Resources Board (CARB) to undertake a statewide effort to reduce global warming pollution. Revenues are generated from the auction of pollution credits. Certain active transportation and transit element improvements could be funded with AB 32 Cap and Trade revenues.

ACTIVE TRANSPORTATION PROGRAM FUNDS

On September 26, 2013, Governor Brown signed legislation creating the Active Transportation Program (ATP) in the Department of Transportation (Senate Bill 99, Chapter 359 and Assembly Bill 101, Chapter 354). The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program focused on making California a national leader in active transportation. These revenues are available to Napa on a competitive basis in two segments: 50 percent of the funds administered statewide by the California Transportation Commission and 40 percent administered regionally by the state's Metropolitan Planning Organizations (for the Bay Area, that entity is MTC). Certain bicycle and pedestrian elements of the corridor improvements would be eligible for funding in this program.

BACKFILLING PROPOSITION 1B

Advocates have characterized the end of the Proposition 1B program as the fiscal cliff because of the precipitous drop in revenues (especially in combination with the ending of federal ARRA fund availability). Efforts to backfill this program include various statewide efforts, including:

- Increasing Vehicle Registration Fees
- Reducing voter threshold to 55 percent on transportation measures
- Statewide tax

Regional

BRIDGE TOLLS

Bay Area funds for street and road projects are principally from regional Bridge Tolls, which are distributed according to "Regional Measure 2" (RM2) passed by voters in 2004. This measure raised the toll on the seven State-owned toll bridges in the San Francisco Bay Area by \$1.00. This extra dollar is to fund various transportation projects within the region that have been determined to reduce congestion or to make improvements to travel in the toll bridge corridors. Specifically, RM2 establishes the Regional Traffic Relief Plan, which identifies specific capital projects and programs eligible to receive RM2 funding. Many of the projects have already been delivered and MTC is evaluating the program in preparation of identifying new investments in the bridge corridors as the 2004 program comes to a close.

Local

LOCAL SALES TAX/FEEs

Recent funding trends at the federal and state levels are putting greater and greater demand on local communities to fund greater shares of their transportation needs. For most jurisdictions in California, the majority of street and road funding is generated locally. This is done via a mix of local General Funds, Developer Fees, and dedicated local transportation taxes, generally sales taxes. In Napa County, voters passed Measure T in November 2012. This will provide a half-cent sales tax for local street and road maintenance.

nance and rehabilitation beginning in 2018. The measure is explicitly for local streets and road rehabilitation and therefore is not likely an eligible source of funds for this project. However, a new sales tax could be passed to support the SR 29 corridor improvements.

Also, NCTPA has the ability to establish a special infrastructure district and could impose fees on developers and businesses to help fund transportation improvements. A countywide traffic mitigation fee for new development could also be considered. If approved by the voters, NCTPA also has the ability to impose a vehicle license fee (VLF) of up to \$10 per vehicle registered in the County of Napa.

Another potential revenue stream might involve a new rapid service partnership with SolTrans that may change the farebox recovery challenges facing expanded service in the corridor by aggregating ridership baselines with the larger system to the south. Partnerships with the Solano Transportation Authority to fund the improvements to the segments of the corridor located in Solano County should also be pursued.

Borrowing

Several state agencies have the ability to issue debt against future transportation revenue streams. This would need to be investigated in light of the revenues that Napa has available for all of its projects. Given the limited revenues received for transportation infrastructure in the County, infrastructure/debt financing has the potential to significantly affect the flow of rev-

enues for maintenance and for improvement of the system.

PROJECT PRIORITIZATION

Project prioritization may be based on a number of factors: participating jurisdictions' goals and priorities, funding availability, safety analysis, and others. One consideration would be prioritizing local trips versus regional trips. The interchange improvements considered in this report range from the urban setting (at American Canyon Road), which serves a substantial amount of local residential and retail trips, to rural/highway settings (at SR 121, SR 221, and Jameson Canyon Road), which serve a higher amount of regional trips. Another consideration that would be guided by County goals could be the prioritization of pedestrian and bicycle projects versus vehicular roadway projects.

For a strictly operational assessment of prioritization, construction cost, right of way acquisition, and operational cost are not considered. Instead, a combination of total intersection volume, projected growth, and intersection performance is a reasonable basis for prioritization. The following identifies some preliminary areas of focus based on these criteria.

Total intersection volume under existing conditions are comparable among the intersections under consideration for improvement, with Jameson Canyon Road (Intersection 8) being slightly higher than the others during the AM peak. For future cumulative conditions, it is forecast that the SR 221 (Intersection 9) and

Jameson Canyon Road intersection volumes will grow higher than the other intersections. SR 221 operates at LOS F in existing conditions and intersection operations are expected to deteriorate with higher future volumes. Jameson Canyon Road, although operating acceptably under existing conditions at the LOS C to E range, is also projected to operate at LOS F without the diamond interchange.

Roadway segment widening improvements will also improve intersection operations. As shown in Table 4-2, the 6 lane Modified Boulevard marginally improves the intersections at American Canyon Road and Donaldson Road, but does show significant improvement at Napa Junction Road. Nonetheless, the higher volumes at SR 221 and Jameson Canyon Road suggest that those intersections remain preliminary candidates for prioritization.

One caveat is that the analysis of intersection performance was performed on an isolated intersection basis. The improvement of one intersection may allow higher volumes to arrive at the downstream intersection and degrade performance. The system-wide interaction of improvements was not comprehensively considered in this analysis.

Table 5-1 on the following page summarizes the proposed recommendations, cost estimations where available, and recommended project prioritization.

TABLE 5-1: RECOMMENDED PROJECT PHASING

Segment or Intersection	Proposed Designs	Estimated Cost	Phasing Recommendation	Staff Comments	Future LOS Without Improvement ¹	Future LOS With Improvement ¹
S1: South of Highway 37	Per Sonoma Boulevard Specific Plan	N/A	N/A - Per City of Vallejo		N/A	N/A
S2: Northern Vallejo	Option 1: Parkway	\$23,170,000	N/A - Per City of Vallejo	City of Vallejo Staff prefers Option 1 (Parkway); this is also consistent with the preferred recommendation for Segment 3	B	B
	Option 2: Southbound Parkway/ Northbound Boulevard	\$28,962,500				
S3: Central American Canyon	Modified Boulevard	\$25,530,000	#2	Recommendations: <ul style="list-style-type: none"> • 6 lane Modified Blvd. • Improved pedestrian amenities at intersections and safety island in median • General landscaping improvements • Class 1 bike/ped path on both sides • Transit: future study of queue jumps, signal priorities, no parking, transit amenities 	C to F (varies by intersection)	C to E (varies by intersection)
S4: Napa Junction Road to SR 12/Jameson Canyon Road	6-lane Parkway from Napa Junction Road to South Kelly Road 4-lane Rural Highway from South Kelly Road to SR 12 Signal timing improvements Diversion of Class II bike lane to North Kelly Road	\$51,004,000	#2		F	C
S5: SR 12 to Urbanized City of Napa	4-lane Rural Highway	\$7,893,000	#3		LOS determined by improvements to I8, I9, & I10 below	
S6: Freeway in Urbanized City of Napa	Urban Freeway; landscaping/gateway improvements only	N/A	#5		N/A	N/A
I8: SR 29/SR 12/Airport Boulevard (Jameson)	Tight Diamond interchange	\$73,100,000	#6		F	F/A (SB/NB ramps)
I9: SR 29/SR 221 (Soscol)	Flyover design per Caltrans preferred alternative	\$48,400,000	#1	Most progress towards complete environmental documentation and funding	F	A
I10: SR 29/SR 121/SR 12 (Carneros)	Channelization/Further Study	\$472,000	#4		F	F ²
Corridor-Wide Improvements						
Transit Improvements	Numerous transit improvements in the corridor are under active study including establishment of a "Bus Rapid Corridor," which may include bus signal priority, signal optimization, bulb outs, queue jumps, additional intersection improvements, and coordinated service with SolTrans	N/A: See Staff Comments	N/A: See Staff Comments	Simultaneous delivery: low cost; different funding sources	N/A	N/A
Signal Timing and Signal Improvements	Various throughout corridor					
Transportation Demand Management	Staggered work/school hours, telecommuting flexibility, etc.					

1. For PM Peak Hour unless otherwise indicated.

2. While proposed improvements do improve average intersection delay, the improvement is not sufficient to fall below LOS F threshold. See Table 4-9.

GOVERNANCE AND COORDINATION

Because the SR 29 Corridor spans multiple jurisdictions, coordination between governments will be required to monitor and implement the multi-jurisdictional projects and programs.

Jurisdictions, in coordination with NCTPA, would be responsible for coordinating improvements with Caltrans on corridor segments that lie wholly within their individual jurisdictional boundaries. Significant improvements that span multiple jurisdictions, such as the widening of the highway from four to six lanes, may require a formal intergovernmental agreement (IGA), a contract specifying the obligations, scope of work and, in some cases, funding responsibilities for each party. Intergovernmental agreements help to achieve a common interest, including the provision of regional services and the sharing of public revenues.

NCTPA, as the agency serving as the transportation congestion and planning agency, will also play a critical role advocating for the project, prioritizing corridor project(s) in the county and regional transportation plans, identifying and prioritizing revenue sources, and serving as a larger coordinating agency for improvements to the SR 29 corridor.

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